C21.S:958/4

Vol. 958 Number 4

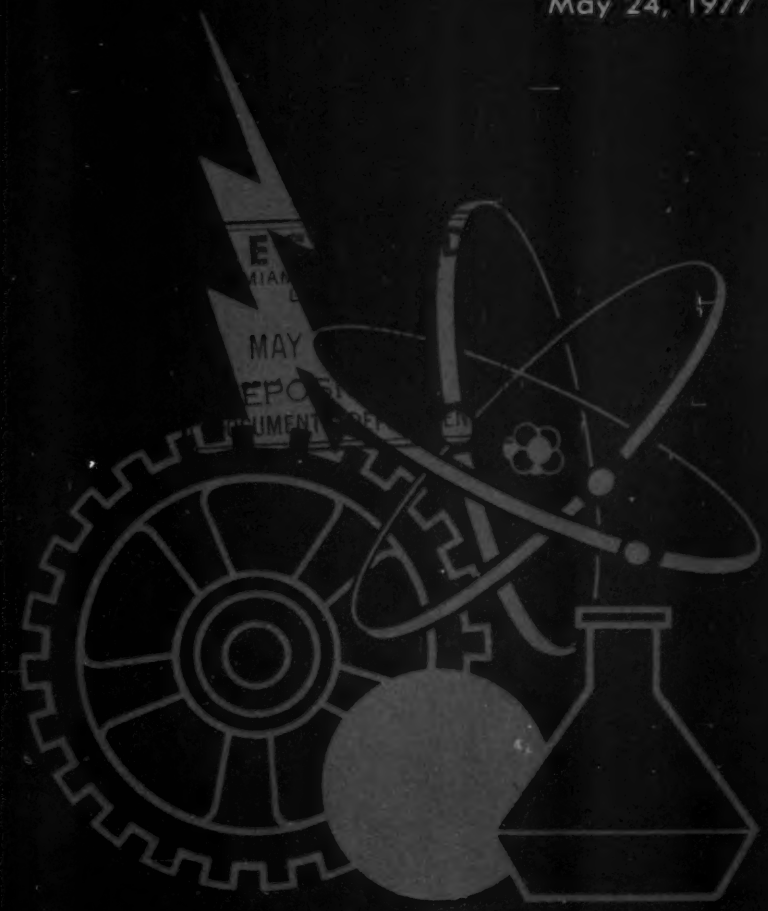
# OFFICIAL GAZETTE

of the

## UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

May 24, 1977



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# OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

May 24, 1977 Volume 958 Number 4


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# PATENT AND TRADEMARK OFFICE NOTICES

## Registration to Practice

The following are names of persons applying for registration to practice before the United States Patent and Trademark Office. Information tending to affect the eligibility of said applicants on moral, ethical, or other grounds, should be furnished the Commissioner of Patents and Trademarks on or before June 24, 1977.

Duzan, James R., 1992 Cambridge Drive, Crofton, Md. 21114
Greenblum, Neil F., 2126 Connecticut Ave. NW., Washington, D.C. 20008
LaPointe, Gregory P., 8 Fawn Drive, Woodbridge, Conn. 06525
Rotkin, Irving J., 10202 Lariston Lane, Silver Spring, Md. 20903
Suyat, Reginald J., 409 S. Lynn Drive, Wilmington, Del. 19809
Wegbreit, Joseph, 12909 Bluhill Road, Silver Spring, Md. 20906

LUTRELLE F. PARKER,
May 2, 1977. *Chairman, Committee on Enrollment.*

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## Patent Suits

**Notices under 35 U.S.C. 290; Patent Act of 1952**

**2,808,332,** Anderson and Rapp, PROCESS FOR FEEDING RUMINANTS AND IMPROVED FEED SUPPLEMENT THEREFOR, **filed** May 22, 1972, D.C., N.D. Ill. (Chicago) Doc. 73c1102, *Feed Service Corporation* v. *Kent Feeds, Inc. and Grain Processing Corp.* Judgment, it is ordered and adjudged that the defendants did not infringe the patent in suit, that the plaintiff take nothing in this action and that the action be dismissed with prejudice, Dec. 2, 1976.

**2,811,069,** A. H. Faulkner, ELECTRICAL MUSICAL INSTRUMENT, **filed** Mar. 29, 1973, D.C., N.D. Ill. (Chicago) Doc. 73c794, *Alfred H. Faulkner* v. *Nippon Gakki Co., Ltd. et al.* Entered findings of fact and conclusions of law, it is ordered and adjudged that the plaintiff take nothing, that the action be dismissed on the merits, Apr. 6, 1976.

**2,882,060,** P. L. Speicher, MOBILE BROADCAST SPREADER; **3,394,892,** same, MATERIAL SPREADER, **filed** Sept. 8, 1970, D.C., N.D. Ill. (Chicago), Doc. 70c55, *The Cyclone Seeder Co., Inc.* v. *Central Quality Industries, Inc.* Consent judgment, Dec. 29, 1972.

**2,885,248,** C. S. White, MOLDED BEARING HAVING LOW FRICTION MATING SURFACES, **filed** Nov. 9, 1976, D.C., C.D. Calif. (Los Angeles) Doc. 76–3489, *Sargent Industries, Inc.* v. *Lear Siegler, Inc.*

**2,893,419,** A. L. Coulter, HAND-CHOKE CONVERSION UNIT, **filed** Aug. 13, 1975, D.C., N.D. Ill. (Chicago) Doc. 75c2715, *MJR Industries* v. *Auto Craft, Inc.* Cause is hereby dismissed with prejudice as all matters in controversy have been settled, Oct. 27, 1976.

**3,040,968,** Long and Crane, WRAPPER FOR PACKAGED PRODUCE, **filed** Sept. 28, 1973, D.C., N.D. Ill. (Chicago) Doc. 37c2484, *Standum, Inc.* v. *Polycraft Corp.* Enter judgment for defendant on the plaintiff's complaint of infringement and on the counterclaim of invalidity, June 15, 1976.

**3,107,836,** C. W. van't Veld, PAPER FORM GUIDE, **filed** Nov. 19, 1976, D.C. (District of Columbia), Doc. 76–2152, *Cecil W. van't Veld* v. *Honeywell, Inc.*

**3,131,700,** A. Radwan, TOBACCO MOISTENING PROCESS, **filed** Mar. 15, 1971, D.C., N.D. Ill. (Chicago) Doc. 71c644, *John Mohr & Sons* v. *Vacudyne Corp. and Arthur N. Lederman.* Defendant's motion for summary judgment granted, Feb. 2, 1973.

**3,166,154,** J. M. Titzel, PORTABLE SCAFFOLDS AND WORK TOWERS, **filed** Dec. 9, 1976, D.C., W.D. Pa. (Pittsburgh) Doc. 76–1541, *Fordees Corporation* v. *Vulcan Inc., and Arland T. Stein and William P. Jancosco.*

**3,174,863,** A. A. Shoup, SMOKELESS BROILER, **filed** June 20, 1975, D.C., N.D. Ill (Chicago) Doc. 75c2025, *Marian Shoup* v. *McGraw-Edison Company.* On motion of parties, enter findings of fact, conclusions of law and decree, Feb. 27, 1976; filed notices of settlement, Mar. 11, 1976.

**3,218,588,** J. G. Badger, TELEVISION TUNER, **filed** Feb. 2, 1973, D.C., N.D. Ill. (Chicago) Doc. 73c304, *Sarkes Tarzian, Inc. and Indian Corporation* v. *General Instrument Corporation.* Entered consent judgment, Jan. 27, 1975.

**3,234,123,** J. N. Hinde, METHOD OF AND MEANS FOR TREATING BODIES OF WATER, **filed** Sept. 17, 1971, D.C., N.D. Ill. (Chicago) Doc. 71c2281, *Schramm, Inc.* v. *James Nelson Hinde and Hinde Engineering Co.* Defendants hereby acknowledge full satisfaction of the judgment rendered by this court in the above-entitled action in favor of defendants. This cause of action is hereby closed, Dec. 10, 1976.

**3,260,028,** R. L. Fraser, METHOD OF CONSTRUCTING A BUILDING, **filed** June 15, 1972, D.C., N.D. Calif. (San Francisco) Doc. C–72–1107–OJO, *International Environmental Dynamics, Inc.* v. *R. Lee Fraser.* Memorandum of decision, the process claimed by said defendant is not patentable. Plaintiff is entitled to judgment as prayed, Nov. 17, 1976.

**3,294,431,** Gregory and Berry, KNOTTER LOCK FOR TYING MACHINE, **filed** June 29, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c2394, *R. H. Bunn Company* v. *Consolidated International Corporation.* On stipulation, order cause hereby dismissed without prejudice, Sept. 28, 1976.

**3,303,345,** Wulms and Hubertus, IMAGE AMPLIFIER WITH MAGNIFICATION GRID, **filed** Dec. 7, 1976, D.C., S.D.N.Y., Doc. 76–C–5427, *Terrific Company* v. *Synergistics Research Corp.*

**3,303,615,** L. O'Neal, INFLATABLE DOCK SEAL, **filed** Apr. 12, 1973, D.C., N.D. Ill. (Chicago) Doc. 73c954, *Larry O'Neal and O'Neal Tarpaulin & Awning Company* v. *Atlas Industries, Inc.* Entered consent judgment, June 25, 1975.

**3,394,892.** (See 2,882,060.)

**3,625,236,** G. Hayano, FOLDABLE UMBRELLA; **3,672,381,** Kida and Saito, COLLAPSIBLE UMBRELLA CAPABLE OF AUTOMATIC OPENING, **filed** July 2, 1975, D.C., S.D.N.Y., Doc. 75–C–3249, *Kazo Saito* v. *Shedrain Umbrella Company.* The second amended complaint and the counterclaim are each dismissed without prejudice, Dec. 14, 1976.

**3,649,962,** Bedard and Spall, Jr., VEHICLE ALARM SYSTEM, **filed** Dec. 2, 1976, D.C.N.J. (Newark) Doc. C–76–2311, *Peter R. Bedard et al.* v. *General Motors Corporation et al.*

**3,672,381.** (See 3,625,236.)

**3,722,002,** J. Charnley, ACETABULAR SOCKETS, **filed** July 14, 1975, D.C.N.J. (Newark) Doc. 75–1223, *Codman & Shurtleff, Inc. et al.* v. *Howmedica,, Inc.* Stipulation and order of dismissal of action, Dec. 6, 1976.

**3,766,375,** Irwin and Levine, SOURCE DATA ENTRY TERMINAL, **filed** July 22, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c2695, *Sycor, Inc.* v. *International Business Machines Corporation.* **Same, filed** July 22, 1976, D.C., E.D. Mich. (Detroit) Doc. 76–71517, *International Business Machines Corporation* v. *Sycor, Inc.*

**3,767,339,** D. B. Hunkar, INJECTION MOLDING CONTROL, **filed** Apr. 29, 1975, D.C., N.D. Ohio (Cleveland) Doc. C75–379, *Hunkar Laboratories, Inc.* v. *Van Dorn Company.* Stipulation and order dismissing case without prejudice, Mar. 25, 1976.

**3,767,339,** D. B. Hunkar, INJECTION MOLDING CONTROL; **3,941,534,** same, INJECTION MOLDING CONTROL SYSTEM, **filed** Dec. 3, 1976, D.C., N.D. Ind. (South Bend) Doc. S76–206, *Hunkar Laboratories, Inc.* v. *Nyloncraft Incorporated.*

**3,928,933,** T. Iwamoto, HOLDING TOY, **filed** Dec. 8, 1976, D.C., C.D. Calif. (Los Angeles) Doc. CV76–3793–LEW, *ITI Hawaii, Inc.* v. *San Park.*

**3,941,534.** (See 3,767,339.)

**Re. 28,861,** S. Hall, Jr., SAFETY MEDICINE BOTTLE CLOSURE, **filed** Dec. 13, 1976, D.C., W.D. Okla. (Oklahoma City) Doc. 76–1011–D, *Plastic Container Corporation* v. *Continental Plastics of Oklahoma, Inc.*

**D. 241,827,** R. Podall, SPLASH GUARD FOR MOTOR VEHICLES, **filed** Dec. 8, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c4504, *Custom Accessories, Inc.* v. *Jeffrey Allan Industries, Inc.*

## REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

**3,891,458,** Re. S.N. 780,649, Filed Mar. 23, 1977, Cl. 429/197, ELECTRIC CURRENT PRODUCING GALVANIC CELL, Morris Eisenberg, Owner of Record: *Electrochimica Corporation, Mountain View, Calif.,* Attorney or Agent: Robert B. Kennedy, Ex. Gp.: 114

**3,894,835,** Re. S.N. 781,262, Filed Mar. 25, 1977, Cl. 432/124, APPARATUS IMPROVEMENTS IN TEMPERATURE CONDITIONING PARTS, Charles L. D. Chin, et al., Owner of Record: *Monsanto Company, St. Louis, Mo.,* Attorney or Agent: Michael J. Murphy, et al., Ex. Gp.: 344

**3,929,103,** Re. S.N. 778,696, Filed Mar. 17, 1977, Cl. 119/14.08, DETACHER MECHANISM FOR MILKING UNIT, Gary W. Schluckbier, et al., Owner of Record: *DEC International, Inc., Madison, Wis.,* Attorney or Agent: Paul R. Puerner, et al., Ex. Gp.: 333

**3,996,011,** Re. S.N. 778,700, Filed Mar. 17, 1977, Cl. 23/273 R, APPARATUS FOR CRUCIBLE-FREE ZONE MELTING OF SEMICONDUCTOR CRYSTAL RODS, Wolfgang Keller, Owner of Record: *Siemens Aktiengesellschaft, Berlin and Munich, Germany,* Attorney or Agent: Benjamin H. Sherman, et al., Ex. Gp.: 175

**4,005,742,** Re. S.N. 781,252, Filed Mar. 25, 1977, Cl. 164/54, METHOD OF RESTORING INGOT MOLD STOOLS AND CLOSED-BOTTOM INGOT MOLD, Robert H. Kachik, et al., Owner of Record: *United States Steel Corporation, Pittsburgh, Pa.,* Attorney or Agent: Forest C. Sexton, Ex. Gp.: 322

# PATENT NOTICES

## Certificates of Correction for the Week of May 24, 1977

| | | | |
|---|---|---|---|
| D. 242,741 | 3,990,854 | 4,003,351 | 4,009,470 |
| D. 243,014 | 3,991,260 | 4,003,393 | 4,009,475 |
| D. 243,036 | 3,992,337 | 4,003,408 | 4,009,633 |
| D. 243,619 | 3,992,945 | 4,003,606 | 4,009,712 |
| 3,787,218 | 3,993,332 | 4,004,012 | 4,009,924 |
| 3,819,745 | 3,993,399 | 4,004,246 | 4,009,989 |
| 3,845,763 | 3,993,544 | 4,004,416 | 4,010,081 |
| 3,846,222 | 3,993,608 | 4,004,643 | 4,010,349 |
| 3,859,126 | 3,993,948 | 4,004,749 | 4,010,476 |
| 3,888,686 | 3,994,074 | 4,004,840 | 4,010,951 |
| 3,897,871 | 3,994,086 | 4,004,891 | 4,011,205 |
| 3,908,200 | 3,994,189 | 4,004,892 | 4,011,224 |
| 3,938,051 | 3,994,262 | 4,004,908 | 4,011,298 |
| 3,940,210 | 3,994,291 | 4,004,910 | 4,011,395 |
| 3,942,301 | 3,994,814 | 4,005,355 | 4,011,563 |
| 3,947,078 | 3,995,069 | 4,005,358 | 4,011,795 |
| 3,949,940 | 3,996,648 | 4,005,460 | 4,012,277 |
| 3,952,180 | 3,997,335 | 4,005,468 | 4,012,571 |
| 3,954,215 | 3,997,407 | 4,005,494 | 4,012,701 |
| 3,957,873 | 3,997,455 | 4,005,552 | 4,012,777 |
| 3,959,776 | 3,997,669 | 4,005,560 | 4,012,808 |
| 3,961,688 | 3,997,773 | 4,006,024 | 4,012,854 |
| 3,961,969 | 3,998,069 | 4,006,028 | 4,012,875 |
| 3,963,271 | 3,998,876 | 4,006,078 | 4,013,291 |
| 3,967,488 | 3,999,046 | 4,006,135 | 4,013,297 |
| 3,968,745 | 4,000,047 | 4,006,186 | 4,013,308 |
| 3,968,880 | 4,000,057 | 4,006,221 | 4,013,345 |
| 3,969,491 | 4,000,417 | 4,006,261 | 4,013,403 |
| 3,970,897 | 4,000,540 | 4,006,314 | 4,013,461 |
| 3,974,096 | 4,000,961 | 4,006,363 | 4,013,550 |
| 3,976,621 | 4,001,027 | 4,006,416 | 4,013,568 |
| 3,978,084 | 4,001,115 | 4,006,461 | 4,013,586 |
| 3,979,920 | 4,001,195 | 4,006,549 | 4,013,802 |
| 3,980,920 | 4,001,220 | 4,006,700 | 4,013,972 |
| 3,981,383 | 4,001,887 | 4,007,067 | 4,014,014 |
| 3,981,564 | 4,001,939 | 4,007,223 | 4,014,016 |
| 3,982,253 | 4,001,953 | 4,007,767 | 4,014,044 |
| 3,982,916 | 4,002,007 | 4,007,854 | 4,014,450 |
| 3,983,067 | 4,002,131 | 4,007,892 | 4,014,468 |
| 3,983,127 | 4,002,328 | 4,007,986 | 4,014,536 |
| 3,983,472 | 4,002,623 | 4,008,235 | 4,014,554 |
| 3,983,664 | 4,002,724 | 4,008,686 | 4,014,798 |
| 3,988,154 | 4,002,881 | 4,009,091 | 4,014,808 |
| 3,988,607 | 4,003,071 | 4,009,133 | 4,015,277 |
| 3,989,463 | 4,003,106 | 4,009,225 | 4,015,415 |
| 3,990,595 | 4,003,130 | 4,009,331 | 4,017,645 |

## Disclaimers

3,370,955.—*Lawrence L. Little*, Creve Coeur, Mo. PROCESS FOR MAKING ACIDIFIED DAIRY PRODUCTS. Patent dated Feb. 27, 1968. Disclaimer filed Mar. 21, 1977, by the assignee, *The Battelle Development Corporation*.

Hereby enters this disclaimer to claim 1 of said patent.

3,501,305.—*Bernard D. Illingsworth*, Rochester, N.Y. MONODISPERSED PHOTOGRAPHIC REVERSAL EMULSIONS. Patent dated Mar. 17, 1970. Disclaimer filed Mar. 30, 1977, by the assignee, *Eastman Kodak Company*.

Hereby enters this disclaimer to claims 10 and 11 of said patent.

3,622,712.—*Robert Milton Moore*, Skillman, and *Charles John Busanovich*, Princeton, N.J. DEVICE EMPLOYING SELENIUM - SEMICONDUCTOR HETEROJUNCTION. Patent dated Nov. 23, 1971. Disclaimer filed Mar. 28, 1977, by the assignee, *RCA Corporation*.

Hereby disclaims the remaining term of said patent.

3,814,725.—*Daniel Zimmerman*, East Brunswick, and *Robert B. Isaacson*, Springfield, N.J. POLYALKYLENE TEREPHTHALATE MOLDING RESIN. Patent dated June 4, 1974. Disclaimer filed Apr. 6, 1977, by the assignee, *Celanese Corporation*.

Hereby enters this disclaimer to all claims (1 through 18, inclusive) of said patent.

3,849,608.—*Rafael T. Bustos*, Atlanta, and *James A. Leach*, Mountain Park, Ga. TELEPHONE MOUNTING STRUCTURE. Patent dated Nov. 19, 1974. Disclaimer filed Dec. 2, 1976, by the assignee, *Leggett & Platt, Incorporated*.

Hereby enters this disclaimer to claims 44, 45, 47 and 48 of said patent.

3,865,331.—*Raymond E. Clever*, Chicago, *Kenyon A. Hapke*, Libertyville, and *Thomas R. Wells*, Des Plaines, Ill. DRIVE INTERFACE SYSTEM. Patent dated Feb. 11, 1975. Disclaimer filed Apr. 1, 1977, by the assignee, *Polaroid Corporation*.

Hereby enters this disclaimer to all claims of said patent.

3,876,021.—*Arthur C. Mueller*, Niles, and *Kenyon A. Hapke*, Libertyville, Ill. MOTION PICTURE CAMERA SYSTEM. Patent dated Feb. 18, 1975. Disclaimer filed Apr. 1, 1977, by the assignee, *Polaroid Corporation*.

Hereby enters this disclaimer to all claims of said patent.

3,968,140.—*Walter Morozowich*, Kalamazoo, Mich. SUBSTITUTED ANILIDE ESTERS OF PGE. Patent dated July 6, 1976. Disclaimer filed Mar. 14, 1977, by the assignee, *The Upjohn Company*.

Hereby enters this disclaimer to claims 2 and 3 of said patent.

3,983,805.—*Charles E. Perkett*, Salem, and *Stephen G. Keith*, Derry, N.H. PRINTER WITH SEQUENTIALLY ACTUATED PRINTING MEANS. Patent dated Oct. 5, 1976. Disclaimer filed Apr. 1, 1977, by the assignee, *MFE Corporation*.

Hereby enters this disclaimer to claims 19 through 22 of said patent.

3,991,838.—*Barry Frederick Clark*, Seaforth, near Sydney, Australia. DRILL SAMPLING DIVERSION UNIT. Patent dated Nov. 16, 1976. Disclaimer filed Feb. 9, 1977, by the inventor.

Hereby enters this disclaimer to the entire remaining term of said patent.

3,997,513.—*Yuzuru Noda*, *Makoto Kojima*, *Shiro Mazaki*, and *Yasutada Katashiba*, Osaka, Japan. SOLUTION FOR FORMING THERMAL RESISTING POLYMERS. Patent dated Dec. 14, 1976. Disclaimer filed Feb. 8, 1977, by the assignee, *Nitto Electric Industrial Company, Ltd.*

The term of this patent subsequent to July 22, 1992, has been disclaimed.

## Dedications

Design No. 205,083.—*James F. Fulton*, Mamaroneck, N.Y. LAMP. Patent dated June 21, 1966. Dedication filed Mar. 4, 1977, by the assignee, *Paulin Products Company*.

Hereby dedicates to the Public the entire remaining term of said patent.

3,372,537.—*Maurice Poull*, Meyrin, Geneva, and *Erwin Zurcher*, Geneva, Switzerland. RADIALLY CLAMPING GRIPS. Patent dated Mar. 12, 1968. Dedication filed Mar. 23, 1977, by the assignee, *Electrospin Corporation*.

Hereby dedicates to the Public the remaining term of said patent.

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3,557,508.—*Cyril P. Frommelt* and *Sylvan J. Frommelt*, Dubuque, Iowa. LOADING DOCK SHELTERS. Patent dated Jan. 26, 1971. Dedication filed Mar. 24, 1977, by the assignee, *Dubuque Awning & Tent Company*.

Hereby dedicates to the Public the remaining term of said patent.

---

3,776,127.—*Edward T. Muse*, Dallas, Tex. ELECTRIC MEAT SMOKER. Patent dated Dec. 4, 1973. Dedication filed Apr. 1, 1977, by the assignee, *Smoker Products, Inc.*

Hereby dedicates to the Public the remaining term of said patent.

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3,781,852.—*Edward A. White*, Fort Wayne, Ind., and *James H. Bunting*, Acton, Mass. CALCULATOR DISPLAY CIRCUIT. Patent dated Dec. 25, 1973. Dedication filed Dec. 2, 1976, by the assignee, *Bowmar Instrument Corporation*.

Hereby dedicates to the Public the entire term of said patent.

---

3,937,289.—*Colin H. Kilgore*, New Kensington, and *Norman P. Wolf*, Pittsburgh, Pa. SOLDERED JOINT AND METHOD. Patent dated May 18, 1976. Dedication filed Feb. 11, 1977, by the assignee, *Aluminum Company of America*.

Hereby dedicates to the Public the remaining term of said patent.

---

3,998,963.—*John A. Durden, Jr.*, South Charleston, and *Anthony A. Sousa*, Saint Albans, W. Va. TERTIARY BUTYL SUBSTITUTED CARBAMOYL OXIME PESTICIDES. Patent dated Dec. 21, 1976. Dedication filed Mar. 30, 1977, by the assignee, *Union Carbide Corporation*.

Hereby dedicates to the Public the remaining term of said patent.

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## Patents Available for Licensing or Sale

3,307,264. GRADING INSTRUMENTS. Charles Wolfe, Jr., 3005 Williams Drive, Winona Lake, Ind. 46590.

3,576,194. REGULATOR VALUE. K. S. Christensen, 2909 S. Osceola Ave., Orlando, Fla. 32806.

3,680,237. OUTDOOR INDOOR ILLUMINATED SIGNS. John G. Finnerty, Sr., 6050 Boulevard East, West New York, N.J. 07093.

3,887,063. CONVEYOR APPARATUS. Juan T. Villanueva and Jesus T. Villanueva, Quezon, Philippines. Correspondence to: Michael J. Striker, 360 Lexington Ave., New York, N.Y. 10017.

3,893,517. LOADER ROLLER ATTACHMENT. K. A. Norvell, Box 1055, Rte. 1, Libby, Mont. 59923.

3,899,157. TACK FASTENER AND STRIPPER. Robert Thomas, 30 W. Chicago Ave., Chicago, Ill. 60610.

3,920,098. PRESSURIZED LUBRICATING SYSTEM FOR RECIPROCATING COMPRESSOR DRIVE. Walter Schroeder, 6 South Coria, Brownsville, Tex. 78520.

3,953,011. VEHICLE SHOCK ABSORBER. Paul M. Staehlin, 9307 McVickers, Oak Lawn, Ill. 60453.

3,953,983. REFRIGERATION METHOD AND REFRIGERATION APPARATUS FOR CARRYING OUT THE METHOD. Ernst Sander. Correspondence to: Craig & Antonelli, 909 Watergate Office Bldg., 2600 Virginia Ave. NW., Washington, D.C. 20027.

3,961,386. TOILET SEAT COVER APPARATUS. Ferdinand Beno, 3548 W. 25th St., Chicago, Ill. 60623.

3,965,663. SPUN YARN. Hans Goetti, Anton Mittler, and Hermann Forer, all of Burglen, Switzerland, assignors to Kammgarnspinnerei Burglen, Burglen, Switzerland. Correspondence to: Michael J. Striker, 360 Lexington Ave., New York, N.Y. 10017.

3,988,192. METHOD FOR TABLING DRAPERIES AND APPARATUS THEREFOR. Merrill Young Landis and Otto Lloy Hilgner, 1340 Fairground Road, Hatfield, Pa. 19440.

3,988,786. AUXILIARY FLUSH VALVE MECHANISM FOR TOILET TANKS. Erick Leufeldt, 54 Anchor Drive, Pittsburg, Calif. 94565.

3,991,550. STABILIZING LINES OR CABLES. Steven H. Cohen, 10570 Twin Rivers Road, Columbia, Md. 21044.

3,993,222. VARIABLE-VOLUME DISPOSABLE APPLIANCE. David Briggs. Correspondence to: Peter K. Kontler, % Kane, Daisimer, Kane, Sullivan and Durucz, 420 Lexington Ave., New York, N.Y. 10017.

4,000,619. MEANS AND METHOD FOR CONTROLLING BEACH AND SANDBAR EROSION. Charles T. Ziegler, 9842 13th St. W., Santa Ana, Calif. 92703.

4,000,847. MAILBOX INDICATOR USED IN CONJUNCTION WITH A MAILBOX. Jack L. Duis, 2784 Copp Road, Niles, Mich. 49120.

4,001,951. BREAST CANCER DETECTION TRAINING DEVICE. W. G. Fasse, P.O. Box K, Bellmore, N.Y. 11710.

4,003,664. MECHANICAL PENCIL WITH LEAD FEED RESPONSIVE TO WRITING PRESSURE. Kemal Butka, New York, N.Y. Correspondence to: Michael J. Striker, 360 Lexington Ave., New York, N.Y. 10017.

4,004,365. SIGNALING FISHING ROD HOLDER. Lester F. Manchester, P.O. Box 1857, Clearlake Highlands, Calif. 95422.

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General Motors Corporation is prepared to grant nonexclusive licenses under the following patent upon reasonable terms.

Application for license may be addressed to the Director Patent Section, General Motors Building, 3044 W. Grand Blvd., Detroit, Mich. 48202.

3,789,698. AUTOMATIC SHIFT FOR A TRANSMISSION.

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Benerson Corporation is willing to grant to domestic manufacturers non-exclusive licenses on reasonable terms under the following patents.

3,805,357. AUTOMATIC STATOR CORE WEDGING MACHINE.

3,822,830. STATOR CORE WINDING MACHINE.

Applications for licenses may addressed to: Walter C. Bernkopf, Division Patent Counsel Contractor Equipment Business Div., General Electric Company, P.O. Box 148, Hartford, Conn. 06101.

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General Electric Company is prepared to grant non-exclusive licenses under the following patents on reasonable terms to domestic manufacturers.

Application for licenses under the following patents may be adressed to: Patent Counsel, Mobile Radio Products Dept., General Electric Company, Lynchburg, Va. 24502.

3,963,982. APPARATUS FOR MEASURING THE RESONANT FREQUENCY AND COEFFICIENT OF COUPLING OF A PLURALITY OF COUPLED PEIXOELECTRIC RESONATORS.

3,992,760. APPARATUS AND PROCESS FOR MEAUSRING THE RESONANT FREQUENCY AND COEFFICIENT OF COUPLING OF A PLURALITY OF COUPLED PIEZOELECTRIC RESONATORS.

Applications for license may be addressed to: Division Patent Counsel, Switchgear & Distribution Transformer Division, General Electric Company, 6901 Elmwood Ave., Philadelphia, Pa. 19142.

3,812,620. APPARATUS AND PROCESS FOR SEGREGATING AND DECOMPOSING HETEROGENEOUS WASTE MATERIALS.

Applications for licenses may be addressed to the General Electric Company, Construction Materials Division, 101 E. Carmel Drive, Suite 205, Carmel, Ind. 46032, Attn: Patent Counsel.

3,970,723. IMPREGNATING AND ENCAPSULATING COMPOSITION FOR USE WITH DRY TYPE TRANSFORMERS AND TRANSFORMERS CONTAINING SUCH COMPOSITION.

3,976,932. BRIDGE TRANSISTOR INVERTER CIRCUIT.

Applications for license may be addressed to the Group Patent Counsel, Major Appliance Business Group, General Electric Company, Appliance Park, Louisville, Ky. 40225.

3,664,207. DUAL RATCHET CLUTCH DRIVE.

3,866,837. SPRAY ARM BEARING.

3,974,696. FOOD THERMOMETER FOR MICROWAVE OVEN.

3,982,096. BAKING OVEN WITH TWO-SIDED BROILING.

3,987,275. GLASS PLATE SURFACE HEATING UNIT WITH SHEATHED HEATER.

3,988,929. HANDLE AND REFLECTOR ASSEMBLY FOR MICROWAVE OVEN FOOD TEMPERATURE SENSING PROBE.

3,988,930. MICROWAVE OVEN FOOD TEMPERATURE-SENSING PROBE.

3,991,615. MICROWAVE OVEN FOOD TEMPERATURE-SENSING PROBE ASSEMBLY.

3,994,608. ADAPTER BETWEEN KNOB AND SHAFT.

3,996,710. SIMPLIFIED OVEN DOOR WINDOW.

4,001,973. REMOVABLE DOOR HINGE SYSTEM.

4,002,883. GLASS-CERAMIC PLATE WITH MULTIPLE COIL FILM HEATERS.

4,004,570. ADJUSTABLE FASTENING MEANS BETWEEN RELATED MEMBERS.

4,008,579. APPARATUS FOR HEAT CONTROL OF A REFRIGERATION SYSTEM.

Applications for license may be addressed: Division Patent Counsel, Switchgear & Distribution Transformer Division, General Electric Company, 6901 Elmwood Ave., Philadelphia, Pa. 19142.

3,790,877. POWER DELIVERY SYSTEM FOR A TANK LOAD CHARACTERIZED BY SERIES-CONNECTED INVERTER BRIDGES AND A HIGH VOLTAGE SOURCE.

3,789,174. EARTHQUAKE-PROTECTIVE SUPPORT SYSTEM FOR ELECTRICAL APPARATUS.

3,801,730. HIGH VOLTAGE CABLE SPLICE WITH PROVISION FOR TESTING THE INSULATION THEREOF AND METHOD OF MAKING SAME.

3,818,165. ELECTRIC CIRCUIT INTERRUPTER.

3,823,248. BUS INCORPORATING CURRENT LIMITING REACTANCE.

3,823,362. COORDINATED MASTER-SLAVE CONVERTER SYSTEM FOR VARIABLE-POWER TANK LOADS.

3,858,076. VACUUM - TYPE CIRCUIT INTERRUPTER WITH INTERLEAVING SPIRAL ELECTRODES.

3,890,258. ELECTRIC CIRCUIT BREAKER WITH SERIES CONNECTED INTERRUPTING AND ISOLATING BREAKS.

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The RCA Corporation offers to grant non-exclusive licenses on reasonable terms and conditions under the following patents.

Inquiries respecting licenses under these patents should be addressed to: RCA Corporation, Staff Vice President, Domestic Licensing, 30 Rockefeller Plaza, New York, N.Y. 10036.

4,009,851. SPACECRAFT STRUCTURE.

4,009,933. POLARIZATION-SELECTIVE LASER MIRROR.

4,009,935. ELECTROCHROMIC DEVICE HAVING A DOPANT THEREIN TO IMPROVE ITS COLOR CENTER ABSORPTION CHARACTERISTICS.

4,010,312. HIGH RESISTANCE CERMET FILM AND METHOD OF MAKING THE SAME.

4,010,318. PROBE FORMING ELECTRON OPTICAL COLUMN HAVING MEANS FOR EXAMINING MAGNIFIED IMAGE OF THE PROBE SOURCE.

4,010,319. SMEAR REDUCTION IN CCD IMAGERS.

4,010,363. LASER ALIGNMENT SYSTEM.

4,010,418. TRANSISTOR CIRCUITS.

4,010,425. CURRENT MIRROR AMPLIFIER.

4,010,473. ANTENNA CONSTRUCTION.

4,010,485. CHARGE-COUPLED DEVICE INPUT CIRCUITS.

4,010,991. METHOD FOR DEVACUATING A VACUUM TUBE.

4,011,407. NARROW-BAND EIGHT-PHASE MODEM.

4,011,464. LOW ENERGY SWITCHING CIRCUIT.

4,011,524. OPTICAL ELEMENT FOR A LASER.

4,011,529. DIRECTIONAL POWER DETECTOR FOR PROPAGATING WAVES.

4,011,563. VARIABLE RANGE AUTOMOTIVE RADAR SYSTEM.

4,011,567. CIRCULARLY POLARIZED, BROADSIDE FIRING, MULTIHELICAL ANTENNA.

4,012,094. ELECTRON TUBE SOCKET HAVING SPRING-WIRE CONTACTS.

4,012,117. LIQUID CRYSTAL MODULE.

4,012,253. HOLOGRAPHIC RECORDING MEDIUM.

4,012,536. ELECTRON BEAM RECORDING MEDIUM COMPRISING 1-METHYLVINYL METHYL KETONE.

4,012,668. GROUND FAULT AND NEUTRAL FAULT DETECTION CIRCUIT.

4,012,684. VOLTAGE REGULATOR CIRCUIT WITH FET AND BIPOLAR TRANSISTORS.

4,013,345. DEFORMABLE MIRROR LIGHT VALVE AND METHOD OF OPERATING THE SAME.

4,013,582. LIQUID CRYSTAL COMPOUNDS AND ELECTRO - OPTIC DEVICES INCORPORATING THEM.

4,013,830. VIDEO DISC STYLUS.

4,013,923. HIGH VOLTAGE REGULATION SYSTEM.

4,014,614. HIGH RESOLUTION, HIGH CONTRAST FABRY-PEROT SPECTROMETER.

4,014,772. METHOD OF RADIATION HARDENING SEMICONDUCTOR DEVICES.

4,014,813. HAFNIUM PYROPHOSPHATE PHOSPHORS AND METHODS OF PEPRARATION.

4,015,279. EDGELESS TRANSISTOR.

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## Erratum

In the May 3, 1977 OFFICIAL GAZETTE a patent of R. W. Peters on STATOR CORE WINDING MACHINE was incorrectly listed under the number 3,882,830 as available for licensing from General Electric Company, Contractor Equipment Business Division. The correct number is 3,822,830.

# PATENT EXAMINING CORPS

**RENE D. TEGTMEYER, Assistant Commissioner**

**WILLIAM FELDMAN, Deputy Assistant Commissioner**

## CONDITION OF PATENT APPLICATIONS AS OF MAY 7, 1977

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices. | 8-2-76 |
| GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides. | 7-26-76 |
| HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes. | 5-4-76 |
| COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography. | 8-27-76 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes. | 7-12-76 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales. | 11-26-75 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material. | 3-15-76 |
| INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts. | 6-1-76 |
| RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating. | 11-22-76 |
| ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring. | 5-3-76 |
| DESIGNS, GROUP 200—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts. | 10-28-75 |
| **MECHANICAL EXAMINING GROUPS** | |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment. | 5-24-76 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks. | 9-10-76 |
| AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination. | 6-1-76 |
| HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication. | 6-11-76 |
| GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines. | 10-12-76 |

**Expiration of patents:** The patents within the range of numbers indicated below expire during May 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,934,766 to 2,939,144, inclusive
Plant Patents..... Numbers 1,938 to 1,948, inclusive

# REISSUES

MAY 24, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,227

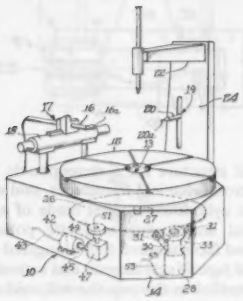
## GEAR CHECKING MACHINE HAVING A FRICTIONALLY DRIVEN SUPPORT TABLE AND POSITION ENCODER

Edward Francis Fabish, Austin, Tex., assignor to Illinois Tool Works Inc., Chicago, Ill.

Original No. 3,882,720, dated May 13, 1975, Ser. No. 425,436, Dec. 17, 1973. Application for reissue Mar. 17, 1976, Ser. No. 667,744

Int. Cl.² G01M 13/02

U.S. Cl. 73—162 5 Claims



1. A gear checking machine comprising a frame, indicating means, a table rotatably mounted in said frame for supporting a gear to be checked, sensing means mounted adjacent said gear for supplying a signal to said indicating means which is indicative of the surface variations of said gear, a first shaft, a relatively large diameter circular disc coupled to said table by said first shaft and supported; below said table by said first shaft, first and second small circular wheels each having a diameter substantially smaller than the diameter of said large disc, said first small wheel having its periphery in engagement with the periphery of said large disc, *a second shaft coupled to said first small wheel, said second small wheel having its periphery in engagement with the periphery of said large disc*, disc drive means coupled to said second shaft for simultaneously revolving said first and second small wheels, said table and said large disc, sensing drive means for driving said sensing means in synchronism with said table and said disc, a third shaft coupled to said second small wheel and encoder means coupled to said third shaft for supplying output signals which are a function of the rotation of said table.

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Re. 29,228

## VEHICLE SAFETY APPARATUS INCLUDING AN INFLATABLE CONFINEMENT

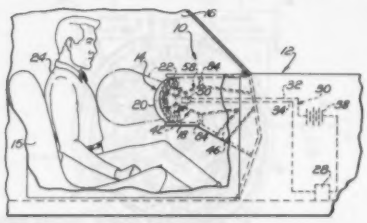
David P. Hass, Detroit, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Original No. 3,632,133, dated Jan. 4, 1972, Ser. No. 801,983, Feb. 25, 1969. Continuation of Ser. No. 234,422, May 4, 1972, abandoned. Application for reissue Oct. 14, 1975, Ser. No. 622,350

Int. Cl.² B60R 21/08

U.S. Cl. 280—738 13 Claims

3. A safety device [as set forth in claim 1] *for protecting an occupant of a vehicle during a collision, said safety device including a confinement which is expansible from a collapsed inoperative condition to an expanded operative condition in which said confinement is adapted to restrain movement of the occupant of the vehicle during a collision, and means for generating one volume of gas and directing it into said confinement and for effecting a flow of larger volume of air into said confinement for admixing with said first volume to inflate said confinement from said collapsed condition to said expanded condition,*



wherein said means for generating said one volume of gas includes a solid-propellant rocket-type device which is at least partially cooled by the flow of said larger volume of air into said confinement.

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Re. 29,229

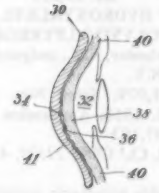
## CONTACT LENS HAVING AN INDEX OF REFRACTION APPROXIMATING THAT OF HUMAN TEARS

Louis J. Girard; Whitney G. Sampson, and Joseph W. Soper, all of Houston, Tex., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Original No. 3,542,461, dated Nov. 24, 1970, Ser. No. 684,364, Nov. 20, 1967. Application for reissue Nov. 24, 1972, Ser. No. 309,443

Int. Cl.² G02C 7/04

U.S. Cl. 351—160 18 Claims



*12. A solid, dimensionally stable corneal contact lens for providing optical correction to a human eye; said lens comprising a transparent, dimensionally stable non-toxic polymer and being characterized by reduced aberrations due to reflected light; said lens having both an anterior surface and a posterior surface shaped to provide optical correction; said lens having a refractive index no greater than 1.40 and having sufficient permeability to oxygen and carbon dioxide to permit circulation therethrough for nutrition of the cornea.*

## Re. 29,230
## ROTARY MOTOR

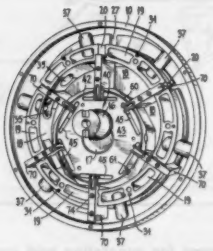
Tony Ralph Sarich, 9 Halse Place, Karrinyup, Australia

Original No. 3,787,150, dated Jan. 22, 1974, Ser. No. 159,834, July 6, 1971. Application for reissue Jan. 22, 1976, Ser. No. 651,592

Claims priority, application Australia, July 6, 1970, 1737/70

Int. Cl.² F02B 53/00

U.S. Cl. 418—61 R 9 Claims



1. An engine comprising a housing having a cavity defined by an internal peripheral wall and opposed end walls; a shaft rotatably supported in said housing; a piston member journalled eccentrically on said shaft to describe an orbital path within said cavity upon relative rotation between said shaft and housing; a plurality of vanes disposed radially to and spaced equally about the axis of said shaft and supported in said housing for reciprocal movement radially with respect to said shaft axis, each of said vanes being connected to said piston member so that said piston member can move relative to each vane in a direction at right angles to the direction of reciprocation of the respective vane and at right angles to said shaft axis to permit orbiting of said piston member upon reciprocation of said vanes relative to said housing; *a plurality of flat faces on the periphery of the piston member, the radially inner face of each vane engaging a respective flat face on the piston member parallel to the direction of relative movement between the vane and the piston member throughout the extent of said movement;* sealing means operatively disposed between each of said vanes and said piston member, said housing peripheral wall and said housing end walls to divide said cavity into a plurality of chambers, the volume of each chamber varying as said piston member orbits; and means to regulate the admission to and exhausting from each of said chambers in sequence of a working fluid to induce orbiting of said piston member and resultant relative rotation between said shaft and housing.

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## Re. 29,231
## COPOLYMER OF HYDROXYALKYL METHACRYLATE AND POLYVINYLPYRROLIDONE

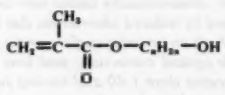
Harry R. Leeds, Rochester, N.Y., assignor to Patent Structures, Inc., New York, N.Y.

Original No. 3,621,079, dated Nov. 16, 1971, Ser. No. 769,032, Oct. 21, 1968. Application for reissue Nov. 16, 1972, Ser. No. 307,183

Int. Cl.² C08F 21/00, 43/00

U.S. Cl. 260—885 11 Claims

1. A water-insoluble polymeric material, which material is swellable in water to a limited extent, consisting essentially of a monomer having the formula



wherein n is 2 or 3 graft polymerized upon about 1 to 70 percent by weight of polyvinylpyrrolidone or of vinylpyrrolidone-vinylacetate copolymer.

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## Re. 29,232
## MAGNETIC STEREOPHONIC PHONOGRAPH PICKUP

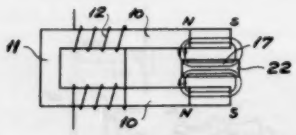
Vilhelm Anneberg, Herlev; Ellen Clemmensen, Birkerod; Robert Gudmandsen, Tastrup, and Axel Scheibel, Kobehhavn NV, all of Denmark, assignors to Fonofilm Industri A/S, Copenhagen, Denmark

Original No. 3,700,829, dated Oct. 24, 1972, Ser. No. 885,220, Dec. 15, 1969. Application for reissue Oct. 23, 1974, Ser. No. 517,222

Claims priority, application Denmark, Mar. 25, 1969, 1636/69

Int. Cl.² H04R 11/12

U.S. Cl. 179—100.41 K 18 Claims




1. A magnetic structure for a stereophonic pickup in the form of an electromechanical transducer, said structure comprising a hollow cylindrical magnet made of a magnetizable ceramic material and having magnetic poles of opposite polarity at the end faces thereof, four elongated core members abutting one end face of said magnet and extending therefrom in a direction parallel to the axis thereof, said core members being arranged symmetrically with respect to said axis, means for magnetically interconnecting said core members at the ends thereof remote from said magnet, further comprising a stylus carrying *permanent magnet* armature, and means supporting said *permanent magnet* armature within and coaxial with said hollow cylindrical magnet for pivotal movement in all directions about a point of said axis spaced from [ the center point ] *any point located interiorly* of said magnet, *said permanent magnet poled oppositely to the polarity of said hollow cylindrical magnet.*

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## Re. 29,233
## IMAGE INTENSIFIER TUBE DEVICE

Augustinus Joannes Cuelenaere, Leiden, and Lambertus Karel Van Geest, Roden, both of Netherlands, assignors to N.V. Optische Industrie "De Oude Delft", Netherlands

Original No. 3,916,240, dated Oct. 28, 1975, Ser. No. 519,298, Oct. 30, 1974. Application for reissue May 12, 1976, Ser. No. 685,657

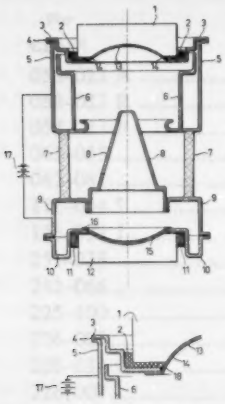
Claims priority, application Netherlands, Nov. 16, 1973, 7315716

Int. Cl.² H01J 39/00

U.S. Cl. 313—102 3 Claims

1. An image intensifier tube device including one or more diode image intensifier tubes, comprising a sealed cylindrical envelope having its one end closed by an entry window on the inner surface of which a photo-sensitive, electron emitting layer is deposited which is in good electrical contact with, and enclosed by, a substantially circular, good electrically conductive rim, and having its other end closed by an exit window on which an anode in the form of a phosphor screen is deposited, means being provided for focussing a beam of electrons released from the photo-sensitive, electron emitting layer by incident radiation, said means comprising at least a cathode flange mounted around the substantially circular, good electrically conductive rim, the cathode flange being sealed [ by fritting ] to the entry window and being electrically connected to an electrically conductive, cylindrical member which constitutes part of the envelope, the device further comprising a source of voltage located outside the envelope,

said voltage source having its positive terminal connected to the anode and supplying such voltages to the anode, the focussing means and the photosensitive, electron emitting layer, that an electric field is formed within the envelope which focusses the beam of electrons released from the photo-sensitive electron emitting layer onto the anode, characterized in that at least one diode image intensifier tube comprises a layer [ deposited by vaporization ] between the good electrically conducting, substantially circular rim and the assembly of the



cylindrical member and the cathode flange, said layer having a high resistance and low capacitance so that, upon a sudden increase in the intensity of the radiation incident on the photosensitive, electron emitting layer takes place up to a level where there is a danger of anode burnout by the released beam of electrons, the increased emission current caused thereby sets up a voltage difference between the good electrically conducting, substantially circular rim and one of the focussing means, such that the electrons are de-focussed and/or deflected.

**Re. 29,234**

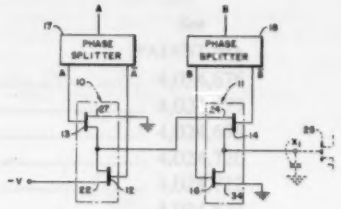
## FET LOGIC GATE CIRCUITS

**Richard H. Heeren, Palatine, Ill., assignor to Teletype Corporation, Skokie, Ill.**

**Original No. 3,596,108, dated July 27, 1971, Ser. No. 874,086, Oct. 27, 1969. Application for reissue July 5, 1973, Ser. No. 376,497**

**Int. Cl.[2] H03K** *13/24*

**U.S. Cl. 340—347 DD** **18 Claims**




**1. A gate circuit, which comprises:**

means for providing a signal on a first lead;

means responsive to a second data signal for providing the second data signal on a second lead and an inversion thereof on a third lead;

means for transferring the signal on the first lead to a first output port in response to a second data signal of one type, and for transferring the signal on the third lead to the first output port in response to a second data signal of a second type;

means responsive to a third data signal for providing the third data signal on a fourth lead and an inversion thereof on a fifth lead;

an output load impedance; and

means for transferring the signal at the first output port to the output load impedance in response to a third data signal of one type, and for transferring the signal on the fourth lead to the output load impedance in response to a third data signal of a second-type.

# PATENTS

## GRANTED MAY 24, 1977

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 058-023 A | 4,024,676 |
| 058-023 R | 4,024,677 |
| 058-023 R | 4,024,678 |
| 062-055 | 4,024,720 |
| 062-081 | 4,024,722 |
| 172-004.5 | 4,024,823 |
| 126-039 J | 4,024,839 |
| 251-038 | 4,024,884 |
| 242-066 | 4,025,009 |
| 225-100 | 4,025,023 |
| 226-003 | 4,025,024 |
| 226-033 | 4,025,025 |
| 226-007 | 4,025,026 |
| 226-181 | 4,025,027 |
| 227-007 | 4,025,028 |
| 227-010 | 4,025,029 |
| 227-112 | 4,025,030 |
| 227-132 | 4,025,031 |
| 227-141 | 4,025,032 |
| 228-033 | 4,025,033 |
| 228-041 | 4,025,034 |
| 228-035 | 4,025,035 |
| 228-193 | 4,025,036 |
| 228-214 | 4,025,037 |
| 229-002.5 EC | 4,025,038 |
| 229-027 | 4,025,039 |
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| 236-090 | 4,025,041 |
| 236-101 C | 4,025,042 |
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| 238-349 | 4,025,044 |
| 239-288.5 | 4,025,045 |
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250-223 R ..... 4,025,770
340-052 C ..... 4,025,781
361-236 ..... 4,025,819
361-008 ..... 4,025,820
361-111 ..... 4,025,821
361-045 ..... 4,025,822
361-111 ..... 4,025,823
361-332 ..... 4,025,824
361-374 ..... 4,025,825
361-334 ..... 4,025,826
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361-436 ..... 4,025,828
361-305 ..... 4,025,829
318-673 ..... 4,025,858
318-696 ..... 4,025,859
320-003 ..... 4,025,860
320-023 ..... 4,025,861
321-002 ..... 4,025,862
321-018 ..... 4,025,863
321-068 ..... 4,025,864
324-163 ..... 4,025,934
310-168 ..... 4,025,960

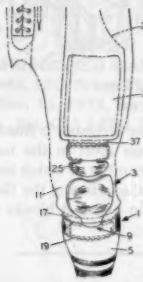
# PATENTS

## GRANTED MAY 24, 1977

NOTE – A cross reference listing of applications published under Trial Voluntary Protest Program on January 28, 1975 is located in the back of this Issue. These entries will be in numerical order by document publication number.

## GENERAL AND MECHANICAL

**4,024,584**
**PAD AND GARMENT ASSEMBLY**
**William Lee Smith, Florissant, Mo., assignor to A-T-O Inc., Willoughby, Ohio**
**Filed July 22, 1976, Ser. No. 707,816**
**Int. Cl.² A41D *13/06***
**U.S. Cl. 2—24** **10 Claims**




1. A pad and garment assembly comprising a pad adapted to be worn on the wearer's body in conjunction with a garment, said pad having a pair of laterally extending ears and said garment having means for receiving the ears detachably to secure the pad to the garment.

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**4,024,585**
**TIE CLASP**
**George W. Girdler, Fort Lauderdale, Fla., assignor to Jack Steinberg, Hialeah, Fla., a part interest**
**Continuation-in-part of Ser. No. 613,172, Sept. 15, 1975, Pat. No. 3,958,277. This application Mar. 15, 1976, Ser. No. 666,962**
**Int. Cl.² A41D *25/08***
**U.S. Cl. 2—153** **8 Claims**

1. A tie clasp for supporting neckwear comprising a plate adapted to be positioned on the front of a shirt collar; hook means mounted on the back of said plate for suspending said plate from the shirt collar; and receiving means mounted on the back of said plate below said hook means through which neckwear may be passed in draping the neckwear ends in mutual lateral or overlaid positions, respectively; and where said receiving means includes a pair of parallel bars rigidly mounted to the back of said plate in mutual generally parallel relation and a connecting bar connecting said pair of parallel bars together and to the back of said plate with said connecting bar extending between and in contact with the back of said plate and said hook means.

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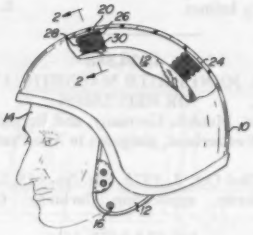
**4,024,586**
**HEADGEAR SUSPENSION SYSTEM**
**Matthew J. Lamb, Newtown, Pa., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**
**Filed Aug. 5, 1976, Ser. No. 711,944**
**Int. Cl.² A42B *3/02***
**U.S. Cl. 2—414** **5 Claims**




1. A headgear suspension system for adaptively fitting a rigid helmet having a predetermined contour to a plurality of differing head contours, comprising, in combination:
a flexible helmet adapted to fit relatively closely to respective ones of the plurality of head contours;
a plurality of discrete corrugated spacers formed in two stacks, each of said stacks having at least two elongated spacer strips positioned parallel to a line drawn between the ears of the head and operatively secured front and rear on the cranial roof thereof and adapted to be disposed intermediate said flexible helmet and the rigid helmet for ventilating and selectively varying the space between said flexible helmet and the rigid helmet to cause the rigid helmet to adaptively fit differing ones of the head contours; and
pressure actuatable interengageable securing means formed to be attached on the inside of the rigid helmet and attached on the outside of said flexible helmet and on respective ones of said spacers for stabilizing the position of the rigid helmet relative to said flexible helmet and respective ones of the head contours and for inhibiting relative movement between said helmets.

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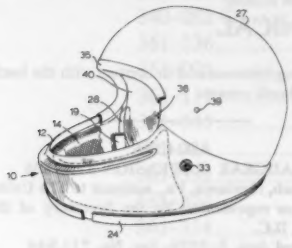
**4,024,587**
**HELMET CONVERSION KIT SAFETY HELMET**
**John Cowper Barford, Toronto, Canada, assignor to Griffin Products Incorporated, Bramalea, Canada**
**Filed Mar. 1, 1976, Ser. No. 662,409**
**Claims priority, application United Kingdom, Mar. 3, 1975, 08776/75**
**Int. Cl.² A42B *1/08***
**U.S. Cl. 2—424** **10 Claims**

1. A chin guard member for cooperation with the lower part of a full coverage safety helmet;
said chin guard member comprising a closed loop of impact resistant material;
the chin guard member having side walls with inner faces inclined inwardly in a downwards direction at least at the rear portion thereof, and adapted to receive as an interference fit therebetween the lower part of a full coverage safety helmet;
the chin guard member having on the inner faces of the side walls inwardly extending protruberances adapted to en-

gage lower forward edges of a full coverage safety helmet when in interference fit between said side walls;



means on the chin guard member for securing it to a full face safety helmet.

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**4,024,588**

**ARTIFICIAL JOINTS WITH MAGNETIC ATTRACTION OR REPULSION**

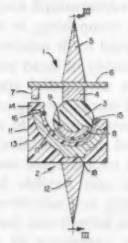
**Rainer Janssen, Munich, Germany, and Bernhard G. Weber, Saint Gall, Switzerland, assignors to Allo Pro A.G., Switzerland**

**Filed Oct. 3, 1975, Ser. No. 619,525**

**Claims priority, application Germany, Oct. 4, 1974, 2447383**

**Int. Cl.² A61F *1/24***

**U.S. Cl. 3—1.91** **22 Claims**



**17.** An artificial joint for implantation into the living body, comprising a head portion and a socket portion each adapted to be fixedly connected to a respective bone, at least one of said head and socket portions including at least one polarized magnet and the other portion consisting at least partly of one of a ferromagnetic material and a polarized magnet, said head and socket portions being shaped so as to permit their mutual movement with respect to one another, at least one of said polarized magnets having an increasing thickness in a direction corresponding to predetermined movement of said head and socket portions with respect to one another, whereby variable magnetic forces are applied to aid said movement.

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**4,024,589**

**SIPHON FLUSH VALVE**

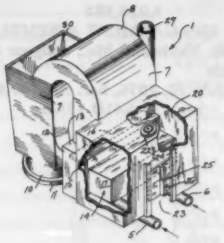
**Clarence Edward Klessig, Sheboygan, Wis., assignor to Kohler Co., Kohler, Wis.**

**Filed Dec. 22, 1975, Ser. No. 642,948**

**Int. Cl.² E03D *1/04, 1/06***

**U.S. Cl. 4—42** **8 Claims**

**1.** A siphon flush valve for use in a water closet tank, said valve comprising: a siphon portion having an upleg open at its bottom end, a downleg that is connectible to a tank outlet, and a counnecting loop; a flap-float valve associated with the upleg; a flap chamber located in an enlarged portion of the bottom end of the upleg in which the flap portion of the flap-float valve is positioned; and a separate float chamber in which the float portion of the flap-float valve is positioned, the float chamber being provided at its bottom with an opening and provided at its top with a check valve that permits air to leave the chamber when the float chamber is filling with water but prevents air from entering the chamber when the tank is



emptying, so that once the chamber is filled with water it does not empty until the water level in the tank falls below the bottom opening of the chamber at which time water leaves the chamber and the float falls swinging the flap from a retracted to an actuated position in which it blocks the upleg.

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**4,024,590**

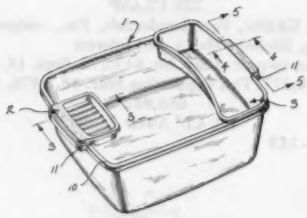
**PATIENT SANITARY CARE UNIT**

**David W. Wendt, Monona, Wis., assignor to Will Ross, Inc., Milwaukee, Wis.**

**Filed Sept. 29, 1975, Ser. No. 617,285**

**Int. Cl.² A47K *1/04***

**U.S. Cl. 4—166** **1 Claim**



**1.** A combination wash basin, emesis basin and soap tray assembly which is easy to store and carry and which can be separated so that the wash basin, emesis basin and soap tray can be used independently, which assembly comprises:

a. a generally rectangular wash basin having a closed bottom and an open top, said wash basin being provided with a laterally extending flange about said top, which flange is interrupted by laterally outwardly extending enlarged handles at opposite ends of said wash basin, said handles having a pair of parallel slots and reinforcing ribs on the underside of the handle on each side of each slot;

b. a generally rectangular emesis basin having a closed bottom, an open top, and one side wall that is concave and one that is straight, said emesis basin being of a length which is only slightly less than the internal width of the wash basin, said emesis basin having an outwardly extending flange extending around the perimeter of said open top, said flange along the straight side wall being interrupted by a single enlarged handle the underside of which is provided with a pair of downwardly extending tongues, said emesis basin being positioned within the wash basin so that the enlarged handle overlies one handle of the wash basin with the tongues positioned within the slots in the wash basin handle and the flange of the emesis basin along all but the concave side wall rests upon the open

top of the wash basin thus supporting the emesis basin within the wash basin; and

c. a relatively small generally rectangular soap tray having a closed bottom and an open top, one side wall of said tray being provided with an outwardly extending handle the underside of which is provided with a pair of downwardly extending elongated tongues each of which are provided with an outwardly extending fingerlike projection, said soap tray being positioned within the wash basin so that the tray handle overlies the other handle of the wash basin and the elongated tongues with the fingerlike projections enter into and cooperate with the slots in the other handle of the wash basin to secure the tray onto the wash basin.

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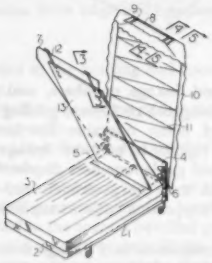
**4,024,591**

## COLLAPSIBLE BED MAKING DEVICE

**Mark B. Raczkowski, 55C Bruan Place, Clifton, N.J. 07012**

**Filed Nov. 12, 1975, Ser. No. 631,229**
**Int. Cl.² A47G *21/00***
**U.S. Cl. 5—321** **4 Claims**



1. A collapsible bed making device for a bed having a bed frame supporting a mattress and comprising:

a supporting structure affixed to the bed frame at one end thereof;

a collapsible blanket frame including a pair of side rods, each of said side rods having a dowel at one end thereof, and a generally U-shaped blanket hanger with the bight of the U being raised with respect to the legs thereof and having a socket at the end of each leg of the U to receive said dowels, said blanket frame being easily assembled and disassembled by separating said blanket hanger from said side rods;

a first pair of pivot mountings on said supporting structure;

disengageable pivot means located adjacent the ends of said side rods of said blanket frame opposite said dowels, said pivot means each releasably engaging a corresponding one of said first pair of pivot mountings;

a collapsible bed spread frame including a pair of side rods, each of said side rods having a dowel at a first end thereof, and a U-shaped bed spread hanger having a socket at the end of each leg of the U to receive said dowels, said bed spread frame being easily assembled and disassembled by separating said bed spread hanger from said side rods;

a second pair of pivot mountings located on said supporting structure above said first pair of pivot mountings;

disengageable pivot means located adjacent the ends of said side rods of said bed spread frame opposite said dowels, said pivot means each releasably engaging a corresponding one of said second pair of pivot mountings;

a stop arm located adjacent the end of each of said side rods of said bed spread frame nearest said pivot means to limit the motion of and to support said bed spread frame after it has been rotated a predetermined amount in excess of 90° from the plane of the mattress;

first fastening means to secure an end of a blanket to said blanket hanger;

second fastening means to secure a bed spread to said bed spread frame;

first bias means opposing the force toward the mattress produced on said blanket frame by the weight thereof;

second bias means opposing the force toward the mattress produced on said bed spread frame by the weight thereof; and

a pair of separation springs removably affixed to said bed spread hanger to support said bed spread frame parallel to the plane of the mattress when the bed is not in use.

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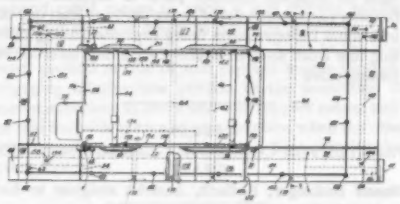
**4,024,592**

## CAMPER-PONTOON BOAT CONSTRUCTION

**Philip B. Schlagenhauf, Middlebury, Ind., assignor to Lan-See, Inc., Berne, Ind.**

**Filed Oct. 20, 1975, Ser. No. 623,585**
**Int. Cl.² B63C *13/00***
**U.S. Cl. 9—1.2** **12 Claims**



11. A convertible camper-boat for terrestrial and aquatic travel comprising:

a camper-body having a fore end, an aft end, and two spaced generally parallel sides connecting said fore and aft ends,

a plurality of flat panels;

means for attaching and supporting each of said panels in a retracted position and in an extended position relative to said body, said panels in said retracted position being disposed adjacent to said body in said extended position extending outwardly from and in supported relation to said body to form a deck space contiguous to said body;

said panels including a panel being in attached and supported relation to each of said sides and a panel attached and supported in relation to at least one of said fore and aft ends;

means for buoyantly supporting said body comprising at least two elongate pontoon members, one of said pontoon members being removably attachable to one of said side panels and a second of said pontoon members being removably attachable to the other of said side panels; and

a plurality of rigid elongate cross beams, said cross beams being transverse and attachable to said pontoon members and longitudinally spaced along said pontoon members, said beams being attachable to said panels to provide rigid support to said panels and said pontoon members.

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**4,024,593**

## METHOD OF FORMING FLAT MULTIPLE-SIDED FASTENER PARTS HAVING AN OPENING THEREIN

**Larry Stuart Pendell, Rte. 8, Box 489, Elkhart, Ind. 46514**

**Continuation-in-part of Ser. No. 578,388, May 19, 1975, abandoned. This application May 19, 1976, Ser. No. 687,764**
**Int. Cl.² B21D *53/20, 53/24***
**U.S. Cl. 10—86 R** **5 Claims**

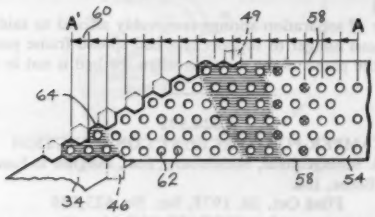
1. A method of forming flat hexagon-shaped individual fastener parts each having an opening therein from an elongated strip of sheet material comprising the steps of:

a. causing said material to pass progressively through a work station;

b. first forming a series of longitudinally spaced openings in

the material as it passes through said work station, and then

c. periodically severing said material as the material passes through said work station from one side edge to the other side edge of the material in one cutting operation along




an irregular cutting line defining contiguous multiple sides of adjacent fastener parts to separate individual fastener parts from said adjacent parts, at least one of said individual fastener parts being separated along said cutting line from such adjacent parts along three of its adjoining sides.

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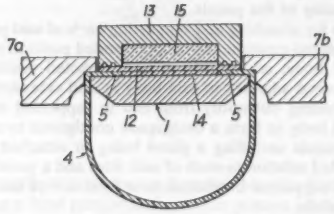
**4,024,594**

## APPARATUS FOR CONNECTING A SHOE SOLE TO ITS SHAFT

**Ferdinand Haizinger, Koflach, Austria, assignor to Koflach Sportgerate Ges. m.b.H., Vienna, Austria**

**Division of Ser. No. 552,746, Feb. 25, 1975, Pat. No. 3,972,087. This application May 19, 1976, Ser. No. 687,938**
**Claims priority, application Austria, Feb. 27, 1974, 1618/74**
**Int. Cl.² A43D *89/00*, *9/00*; A43G *1/20***
**U.S. Cl. 12—4.2** **6 Claims**




1. Apparatus for connecting the sole of a shoe with its shaft comprising a mold having a contour corresponding to the shape of the sole and at least two jaws being movably supported and being arranged for being pressed against the mold and for laterally enclosing the mold so as to bend an edge portion of the shaft against the side of the mold, said jaws being provided with rims extending in an inward direction and overlapping the edge of the mold over its total circumference, said rims having a smaller height as compared with the width of the protruding and bent edge of the shaft, and a press ram cooperating with the mold and having a contour approximately corresponding to the border line, facing the center of the mold, of the rims of the jaws, the mold and the press ram being formed as electrodes connected to a radio frequency generator.

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**4,024,595**

## LINKAGE BRIDGE

**James Brown, 2950 Iris Ave., San Diego, Calif. 92154**

**Filed May 21, 1976, Ser. No. 688,713**
**Int. Cl.² E01D *1/00***
**U.S. Cl. 14—1** **5 Claims**

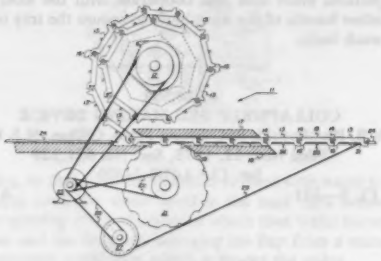
1. A linkage bridge comprising:

a plurality of link members rotatably coupled in an end-to-end relationship forming an elongated structural platform;

rotational stop means between each adjacent link member forming a rotational stop and resulting in a flat linear structural platform at one extreme of rotation between each adjacent link member;

a reel coupled to an end link member and operable for rotationally taking up all of said link members for storing and transporting;

first and second structural guide members disposed above



and below said linkage members, said guide members defining an elongated rectilinear guiding for said linkage members and being operable for lending structural strength and rigidity to paid-out linkage members, said first and second guide members disposed in proximity to said reel such that the protruded end of said linkage bridge is self-supporting without auxiliary support members; and

a drive wheel coupled to said linkage members, said drive wheel operable for paying out and taking up said linkage members.

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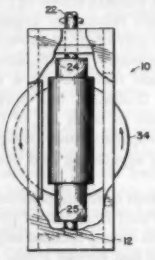
**4,024,596**

## APPARATUS FOR CLEANING SLICES OF MATERIAL

**Philip Joseph Rioux, Glendale, Ark., assignor to Motorola, Inc., Chicago, Ill.**

**Filed Nov. 5, 1975, Ser. No. 628,860**
**Int. Cl.² A46B *13/02*; B08B *7/00***
**U.S. Cl. 15—21 D** **12 Claims**




1. Apparatus for cleaning a slice of material comprising:

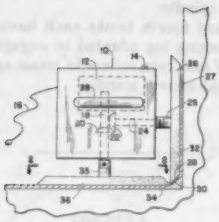
opposed rotatable cleaning surfaces for engaging opposite faces of the slice and for rotating said slice; and

stop means engaging the periphery of said slice so that at least one of said surfaces engages said slice at a face portion comprising one but not both extremities of a chord the slice off-center with respect to said opposed rotatable cleaning surfaces.

## 4,024,597
## SIMULTANEOUS FLOOR EDGE AND BASEBOARD CLEANER

Roy E. Fouracre, Mississauga, Canada, assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed July 6, 1976, Ser. No. 703,001
Int. Cl.² A47L *11/16*; A46B *13/02*
U.S. Cl. 15—28 3 Claims



1. A simultaneous floor edge and baseboard cleaner, comprising:
a housing,
a motor mounted in the housing and connected to an electrical source,
a shaft connected to the motor and extending through the housing downwardly,
a brush attached to a distal end of the shaft, whereby a floor may be cleaned,
a bevelled gear attached to a portion of the shaft,
a second bevelled gear engaging the bevelled gear,
a shaft connected to the second bevelled gear at right angles to the shaft and extending through the housing, and
a brush attached to a distal end of the second shaft, whereby a baseboard may be cleaned.

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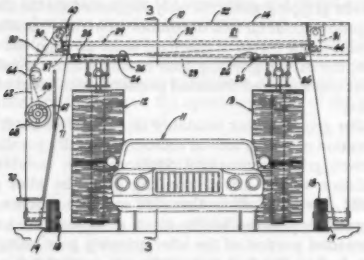
## 4,024,598
## BRUSH CONTROL SYSTEM FOR VEHICLE WASH APPARATUS

Earl L. Miner, Lebanon, Mo., assignor to Detroit Tool & Engineering Co., Lebanon, Mo.

Filed Aug. 14, 1975, Ser. No. 604,497
Int. Cl.² B60S *3/06*
U.S. Cl. 15—53 A 10 Claims



1. In a vehicle wash brush control system:
a. base means including spaced pivot points,
b. a first movable means movably mounted to the base means and carrying a first depending brush means,
c. a second movable means movably mounted to the base means and carrying a second depending brush means,
d. compensating means including:
1. a first support means pivotally mounted to the base means at one of said pivot points and including an engagement portion spaced from said pivot point,
2. a second support means pivotally mounted to the base means at the other of said pivot points and including an engagement portion spaced from said pivot point, and
3. interconnecting means operatively connecting said first and second support means together for mutual transverse movement in the same general direction,
e. first cable means including a first end portion connected to one of said movable means, a second end portion connected to the other of said movable means, and an intermediate portion operatively connecting said end portions, said intermediate portion being bearingly engageable with the engagement portion of one of said support means,
f. second cable means including a first end portion connected to one of said movable means, a second end portion connected to the other of said movable means, and an intermediate portion operatively connecting said end portions, said intermediate portion being bearingly engageable with the engagement portion of the other of said support means, and
g. pull means operatively connected to one of said first and second cable means to apply a pull thereto tending to urge said movable means in opposite directions,
h. said pull means tending to apply a force to the engagement portion of one of said support means through the engaging intermediate portion of the associated cable means sufficient to move said one support means and one of said movable means in one direction when the other of said movable means is prevented from moving in the other direction.

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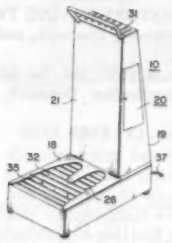
## 4,024,599
## SHOE CLEANER MACHINE

Carlos E. Gamboa, Paterson, N.J., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Dec. 29, 1975, Ser. No. 644,551
Int. Cl.² A47L *23/22*
U.S. Cl. 15—311 1 Claim



1. A machine for cleaning the undersides of a shoe worn by a person standing on the machine, comprising
a housing shaped with an extended platform,
an open grill section formed in said platform of a size to fit about the undersides of a pair of shoes, together with projecting stop means mounted to said grill so as to orient a shoe on said grill section along a first axis when the heel of said shoe is rested against said stop means,
a belt mounted on a pair of rollers and fitted with bristles projecting from the external surface of the belt, said belt mounted under the platform with the bristles extending through the grill,
motorized means to rotate one of said rollers to drive said belt along a direction of travel normal to said first axis, said means serving to also rotate a fan inside the housing located so as to draw in air through the grill, and
a strainer bag located in the housing in a position to receive air expelled by the fan and capture entrapped debris in the air, bring grill being formed of spaced rods oriented generally parallel to the direction of travel of the belt,

along a second axis generally normal to said first axis, with

said bristles formed of different lengths so as to generally match the profile of the undersurface of a shoe resting on said grill and bearing against the stop.

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**4,024,600**

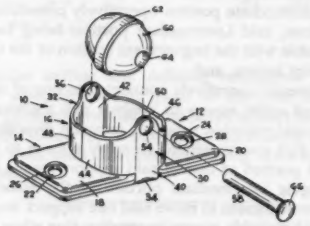
## ROLLER UNITS

**Irving Feinberg, Saddle Brook, and Carl Friedrich, Union, both of N.J., assignors to Presto Lock Company, division of Walter Kidde & Company, Inc., Elmwood Park, N.J.**

**Filed July 21, 1975, Ser. No. 597,755**

**Int. Cl.² B60B *33/00***

**U.S. Cl. 16—31 R** **9 Claims**



1. A unit adapted to receive a roller comprising a housing of sheet metal having an elongated base and a roller-receiving shell, the base having an opening on each side of the shell to receive fastening means for the unit, the shell including a pair of walls integral with the bent from opposite edges of the base, each of the walls having a central stem and a pair of arms projecting from each stem and overlapping the base, the arms of one wall extending toward and mating with the corresponding arms of the other wall.

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**4,024,601**

## HOUSING FOR CASTORS HAVING TWIN ROLLERS

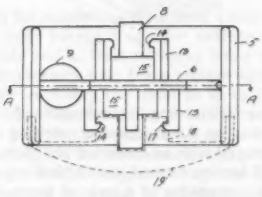
**Bent Harlang, Klampenborg, Denmark, assignor to Kevi A/S, Glostrup, Denmark**

**Filed Feb. 4, 1976, Ser. No. 655,295**

**Claims priority, application Denmark, Feb. 19, 1975, 614/75**

**Int. Cl.² B60B *33/00***

**U.S. Cl. 16—31 R** **3 Claims**



1. A housing for castors having twin rollers, said twin rollers being of the type having a groove in the cylindrical surface of its inwardly projecting hub, said housing comprising:

a. a unitary roller cover having a central partition;

b. a first axle rigidly mounted on said partition and extending from a first side of said partition, said first axle adapted to support one of said twin rollers;

c. a second axle rigidly mounted on said partition and extending from a second side of said partition, said second axle adapted to support the other of said twin rollers;

d. a bore in said partition spaced from said first and second axles and adapted to receive a spigot for said castor;

e. a first and second slightly elastic hooks extending from said first side of said partition, said first and second hooks being located along an arc of a circle which is concentric with said first axle;

f. third and fourth slightly elastic hooks extending from said second side of said partition, said third and fourth hooks being located along an arc of a circle which is concentric with said second axle;

g. said first and second hooks each having a radially inward projecting lug adapted to engage said groove in said one of said twin rollers to retain said one of said twin rollers on said first spindle;

h. said third and fourth hooks each having a radially inwardly projecting lug adapted to engage said groove in said other of said twin rollers to retain said other of twin rollers on said second spindle.

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**4,024,602**

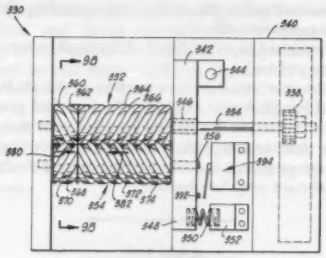
## APPARATUS FOR DECASING FOOD LINKS

**Charles E. Stiles, Tulsa, Okla., assignor to Actionite Company, Inc., Tulsa, Okla.**

**Filed Feb. 10, 1975, Ser. No. 548,518**

**Int. Cl.² A22C *13/00***

**U.S. Cl. 17—1 F** **29 Claims**



1. In a decasing apparatus for removing the casing from food links wherein the food links are contained in a casing string, the apparatus having a frame, a casing string drive means, and a casing slitter assembly imparting a slit in the casing at each of the food links, an improved casing stripper comprising:

a driven gripping gear rotatably supported on the frame for rotation about an axis of rotation generally parallel to the direction of travel of the food links through the apparatus, the driven gripping gear having a first threaded portion and a second threaded portion which meet at a juncture;

an idler gripping gear rotatably supported on the frame for rotation about an axis of rotation generally parallel to the driven gripping gear and positionable in variable spatial relation to the driven gripping gear, the idler gripping gear having a first threaded portion and a second threaded portion which meet at a juncture, the first threaded portion of the idler gripping gear being reverse pitched to the first threaded portion of the driven gripping gear and meshingly engageable therewith, and the second threaded portion of the idler gripping gear being reverse pitched to the second threaded portion of the driven gripping gear and meshingly engageable therewith;

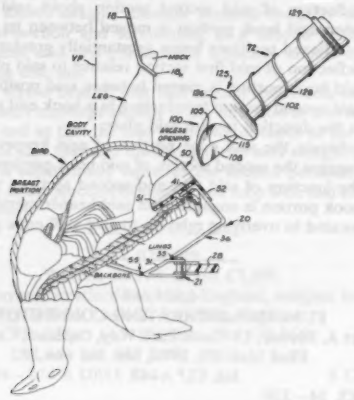
biasing means for biasing the idler gripping gear toward and in gearing engagement with the driven gripping gear; and

drive means for rotating the driven gripping gear, the driven gripping gear rotating the idler gripping gear in gearing engagement therewith, each threaded portion rotating to move in apparent linear direction towards the junction of the first and second threaded portions of each of the drive and idler gripping gears.

## 4,024,603
## LOW NOISE VACUUM LUNG MACHINE

Grover S. Harben, Jr., Gainesville, and Kenneth Z. Graham, Dawsonville, both of Ga., assignors to Gainesville Machine Company, Inc., Gainesville, Ga.

Continuation-in-part of Ser. No. 217,206, Jan. 12, 1972, Pat. No. 3,908,229, and Ser. No. 430,209, Jan. 2, 1974, Pat. No. 3,902,221. This application Sept. 24, 1975, Ser. No. 616,258
Int. Cl.² A22B 3/08
U.S. Cl. 17—11 25 Claims



1. Poultry eviscerating apparatus for removing viscera from within the body cavity of poultry through an access opening at the rear end of the poultry comprising:

a. means for selectively moving the poultry along a prescribed path;

b. a vacuum operated eviscerating tool assembly having an operating end;

c. carriage means for selectively moving the operating end of said eviscerating tool means through the access opening of the poultry into the body cavity to a position so that the operating end of the eviscerating tool means overlies the viscera to be removed from within the body cavity with the tool assembly projecting through the access opening;

d. vacuum means for selectively imposing a vacuum within the body cavity through the operating end of said eviscerating tool means while the operating end of the eviscerating tool means overlies the viscera; and,

e. muffler means for introducing ambient air therethrough into the body cavity while preventing admission of ambient air into the body cavity without passage through said muffler means to limit the operating noise of the apparatus to a prescribed level.

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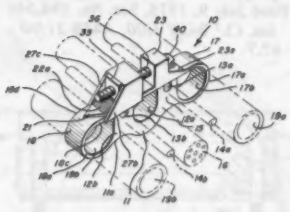
## 4,024,604
## CLAMP

Boleslaw M. Klimek, Des Plaines, and Victor Mastis, Hinsdale, both of Ill., assignors to The Echlin Manufacturing Company, Branford, Conn.

Filed Feb. 23, 1976, Ser. No. 660,140
Int. Cl.² B65D 63/00
U.S. Cl. 24—16 R 24 Claims

1. A clamp for use in retaining a plurality of elongated tubular units in spaced relation comprising a base having a plurality of wells arranged in spaced relation, each well being adapted to receive one of such units; a first portion adjustably mounted on said base and partially defining one well; a second portion adjustably mounted on said base and partially defining a second well; and a sectional locking means having a first section carried on said first portion and a complemental second section carried on said second portion, said locking means being in interlocking relation when said first portion and said second portion assume a predetermined relative position whereby said wells partially defined by said portions conform



to the tubular units retained therein and said portions cooperate with said base to securely retain all such units in said wells

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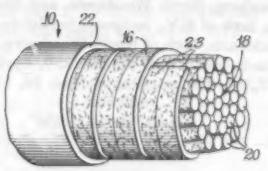
## 4,024,605
## FLEXIBLE HINGE PIN

Albert E. Henke, Naperville, Ill., assignor to Flexible Steel Lacing Company, Downers Grove, Ill.

Filed Dec. 18, 1975, Ser. No. 642,075
Int. Cl.² F16G 3/02
U.S. Cl. 24—33 P 3 Claims



1. A hinge pin for connecting belt fasteners attached to adjacent ends of a conveyor belt comprising an elongated internal stranded core substantially circular in cross-section and having a plurality of individual wire strands extending substantially the length of the pin, said wire strands comprising larger diameter strands spaced around the circumference of said cross-section with smaller diameter strands interior of said large diameter strands,

a metallic ribbon overlay having a plurality of wraps each surrounding said stranded core and helically wrapped about said core adjacent said larger diameter strands to substantially enclose said core to protect the individual wire strands against direct shear contact with the belt fasteners, shear loading by said belt fasteners being applied across said overlay,

said helical wraps of said overlay being spaced from adjacent wraps to facilitate bending flexibility of the said hinge pin,

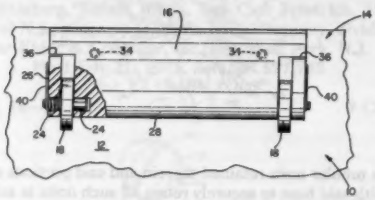
end caps swaged to said spiral overlay and said stranded core for securing said strands and said metallic ribbon overlay against unwinding and separation, and

an external flexible plastic coating on said overlay and extending between said caps to protect said spiral overlay and said strand portion from environmental hazards, said hinge pin being flexible for repeated bending between a linear position and a position in which the ends of the said pin are upturned to a trough configuration.

## 4,024,606
## PAPER HOLDING

John F. Tripp, Medfield, Mass., assignor to Dennison Manufacturing Company, Framingham, Mass.

Filed July 9, 1975, Ser. No. 594,546
Int. Cl.² B42F 1/00; A44B 21/00
U.S. Cl. 24—67.7 8 Claims



1. A clipboard comprising
a backing member,
a handle fixedly secured to a shaft with extending pivot ends,
two cresent shaped cams each having a slot on an inner surface to receive a pivot end of said shaft,
two supports having recesses for receiving the shaft ends,
a spring coiled about each pivot end of said shaft and having one end secured to one of said supports and another end engaging an inner surface of each cam,
said spring securing the shaft ends in the recesses of said supports and biasing the cams and the handle toward said backing member.

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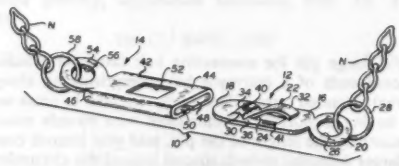
## 4,024,607
## CLASP

Melvin Rosenberg, North Woodmere, and Sheldon Brickner, Brooklyn, both of N.Y., assignors to Melvin Rosenberg and Morris Schwartz, both of North Woodmere, N.Y.

Continuation-in-part of Ser. No. 569,259, April 18, 1975, Pat. No. 3,967,351. This application Mar. 24, 1976, Ser. No. 669,808
Int. Cl.² A44B 17/00
U.S. Cl. 24—201 HE 8 Claims



1. In a clasp for an article of jewelry having a latch member engageable with a keeper member, said latch member having a base plate with a forwardly insertable end portion and further having a resiliently depressible hook portion projecting outwardly from said plate, said hook portion extending rearwardly of said insertable end portion and being disposed for movement between an extended position and a flexed position in the direction toward said plate, said keeper member having walls defining an opening through which the latch member may be inserted when said hook portion is in its flexed position, and retaining means on said keeper member engageable with said hook portion to permit said hook portion to move to its extended position for fastening said clasp, said retaining means comprising an edge portion of at least one of said walls, said edge portion being spaced from said opening, and said engaged hook portion overlying said edge portion when said hook portion is moved in the direction of withdrawal from said keeper member to thereby prevent movement of said engaged hook portion to its flexed position, said keeper member being sized to permit additional movement of said latch member in the direction of insertion for unfastening said clasp and disengaging said hook portion from said retaining means to permit said hook portion to be moved to its flexed position for withdrawing said latch member from said keeper member, wherein the improvement comprises:
a. said hook portion having a first section connected to said plate and a second section connected to said first section, said first and second sections each projecting outwardly from said plate;
b. said first section having a transverse dimension greater than the corresponding dimension of said second section to define a shoulder at the juncture of said sections, the deflection of said second section about said juncture when said hook portion is moved between its extended and flexed positions being substantially greater than the deflection of said first section relative to said plate when said hook portion is moved between said positions; and
c. said second section terminating in a hook end projecting in the direction toward said plate;
d. wherein the wall edge portion of said keeper member engages the second section of said hook portion adjacent the juncture of said first and second sections when said hook portion is engaged with said keeper member and is located in overlying relation to said wall edge portion.

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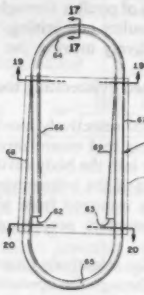
## 4,024,608
## FUNCTION-SEPARATING CONNECTOR

Robert A. Brewer, 15 Castle Park Way, Oakland, Calif. 94611

Filed Mar. 15, 1976, Ser. No. 666,883
Int. Cl.² A44B 13/02
U.S. Cl. 24—236 2 Claims



1. A function separating connector for connecting a camera to a carrying harness comprising:
a. A single wire having a first and second ends, bent to a configuration lying generally within a single plane and consisting of a mid-portion with generally straight and parallel portions of said wire and a single loop end on one side of said mid-portion and a double loop end on the other side of said mid-portion;
b. an elongated, non-abrading, parallel sided sleeve member frictionally removably affixed and surrounding said wire and substantially covering said straight mid-portion and said wire ends whereby one loop end is uncovered and is adapted for connection to a camera lug and the sleeve separates the other loop end which is uncovered and adapted for connection to a neckstrap or harness strap hook and the sleeve prevents said hook and wire connector from sratching the surface of a camera;
c. said wire member consists of:
1. a first straight member inclined inwardly of said mid-portion and terminating in a first distal end within said mid-portion and adjacent to said single loop end,
2. a first loop portion connected to said first straight portion bent on a curve of about 180° and forming one of said loops of said double loop end;
3. a second straight member connected to said first loop

portion on a line spaced from said first straight member,

4. a second loop connected to said second straight member bent on a curve of about 180° and forming said single loop end,

5. a third straight member connected to said second loop spaced from and on a line convergent to said second straight member in a direction toward said first loop,

6. a third loop connected to said second straight member generally overlying said first loop member and bent on a curve of about 180°,

7. a fourth straight member inclined inwardly of said mid-portion and terminating in a second distal end within said mid-portion and adjacent to said double loop end; and

d. said wire is bent so that said second and fourth straight members converge slightly in the direction of said double loop end so that the first perimeter distance at the junction of said first and third loops with said straight members is substantially equal to the second perimeter distance at the junction of said second loop with said straight members.

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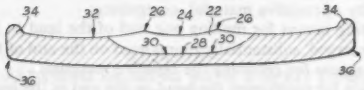
**4,024,609**

## WORM DRIVE HOSE CLIPS

**Ronald Haynes, Stratford-on-Avon, England, assignor to Herbert Terry & Sons Limited, Redditch, England**

**Filed Apr. 14, 1976, Ser. No. 677,066**
**Int. Cl.² F16L *33/08***
**U.S. Cl. 24—274 R** **6 Claims**




1. A worm drive hose clip comprising a housing, a band having one end secured to the housing and the other end passed through the housing, and a screw which is effectively journalled in the housing and held axially captive therein, wherein the improvement comprises teeth formed on one face of the band for engagement with the screw, which are in part raised from the band and the roots of which are recessed into the band and each of which has a crest which is concave along a central portion of its length extending transversely of the band, the root-to-crest height of the central portion of each tooth increasing toward each end of said central portion of the crest.

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**4,024,610**

## METHOD AND APPARATUS FOR TEXTURIZING CONTINUOUS FILAMENTS

**Hsin Lang Li, Parsippany; Alfred Louis Liland, Wharton, and Hendrikus Johan Oswald, Morristown, all of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.**

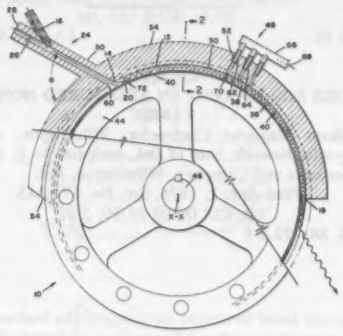
**Filed Oct. 2, 1975, Ser. No. 619,086**
**Int. Cl.² D02G *1/20, 1/16, 1/12***
**U.S. Cl. 28—1.3** **18 Claims**

1. Apparatus for crimping continuous filaments comprising:

a. a chamber having a moveable, perforate yarn receiving means disposed therein;

b. fluid directing means having an angular disposition relative to said yarn receiving means for directing a stream of heated fluid containing said filaments into contact with said yarn receiving means to initiate crimping thereof, the angle of disposition being such that impingement of said filaments occurs within said chamber, said yarn receiving means being adapted to separate the major portion of said fluid from said filaments and to expel it from said chamber and to provide a continuously moving surface associated with said chamber to cause overfeeding of said filaments into said chamber, said filaments being forced against a mass thereof within said chamber to produce crimps therein; and

c. crimp setting means, including fluid jet heating means disposed in said chamber downstream of said fluid direct-



ing means, for contacting said mass of filaments with at least a second stream of heated fluid to set the crimps, whereby said filaments emerge from the chamber in crimped form.

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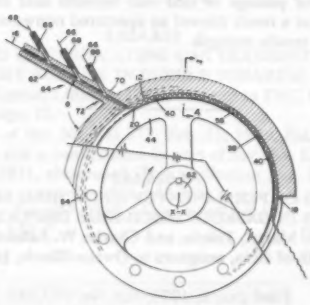
**4,024,611**

## METHOD AND APPARATUS FOR TEXTURIZING CONTINUOUS FILAMENTS

**Hsin Lang Li, Parsippany; Alfred Louis Liland, Wharton, and Hendrikus Johan Oswald, Morristown, all of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.**

**Filed Oct. 2, 1975, Ser. No. 619,085**
**Int. Cl.² D02G *1/20, 1/16, 1/12***
**U.S. Cl. 28—1.3** **19 Claims**



1. Apparatus for crimping continuous filaments comprising:

a. a chamber having

a moveable, perforate yarn receiving means disposed therein;

b. fluid directing means having an angular disposition relative to said yarn receiving means for directing a stream of compressible fluid containing said filaments into contact with said yarn receiving means to initiate crimping thereof, the angle of disposition being such that impingement of said filaments occurs within said chamber, said yarn receiving means being adapted to separate the major portion of said fluid from said filaments and to expel it from said chamber and to provide a continuously moving surface associated with said chamber to cause overfeeding of said filaments into said chamber, said filaments being forced against a mass thereof within said chamber to produce crimps therein; and

c. heating means connected to and upstream of said fluid

directing means for contacting said filaments with heated fluid to increase the temperature of the filaments.

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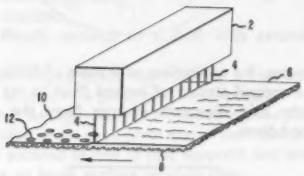
4,024,612

## PROCESS FOR MAKING AN APERTURED NONWOVEN FABRIC

Rashmikant Maganlal Contractor, Wilmington, and Birol Kirayoglu, Newark, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 2, 1976, Ser. No. 673,343
Int. Cl.² D04H 18/00, 5/02
U.S. Cl. 28—72.2 F 5 Claims



1. In the process of impinging fine columnar streams of liquid onto one face of a fibrous web on an apertured support passing beneath said streams and then onto the opposite face of said web on an asymmetrical woven-wire screen passing beneath said streams to produce by fiber entanglement an apertured nonwoven fabric wherein the apertures in said fabric correspond to knuckles in said screen, the improvement comprising carrying out the impingement of said fine columnar streams onto said opposite face of said web wherein the wires forming the higher knuckles in said screen run in the direction of passage of said web beneath said streams and obtaining as a result thereof an apertured nonwoven fabric of increased tensile strength.

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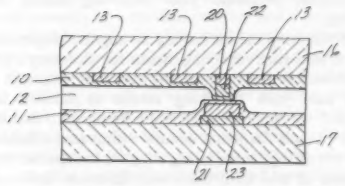
4,024,613

## METHOD OF PERMANENTLY ATTACHING METALLIC SPACERS IN GASEOUS DISCHARGE DISPLAY PANELS

Richard A. Martel, Toledo, and Charles W. Salisbury, Risingsun, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Jan. 2, 1975, Ser. No. 537,947
Int. Cl.² H01J 61/30
U.S. Cl. 29—25.13 8 Claims



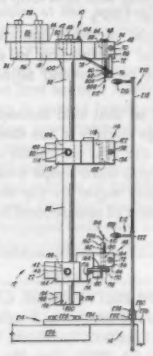
1. A method of permanently attaching metallic spacers in a gaseous discharge display panel which comprises ultrasonically bonding said spacers to tabs of the same metal deposited on the glass substrate of said panel between the conductors thereof.

4,024,614

## APPARATUS FOR PRODUCING RESISTORS

Jack Olan Utterback, Lindsay, Okla., and John Fajt, Northbrook, Ill., assignors to ELT, Incorporated, Northfield, Ill.

Filed May 30, 1975, Ser. No. 582,168
Int. Cl.² B21P 19/04
U.S. Cl. 29—33 K 12 Claims



1. An apparatus for producing a resistor from a lead and a quantity of resistive material, comprising:

heating means for melting one end of the lead to form an enlarged, substantially round head on the end of the lead;

die means for retaining the resistive material;

means for positioning the head on the end of the lead in the resistive material in the die means; and,

fluid pressure compensated compression means for applying a predetermined pressure to the resistive material in the die means to form an integral resistive body around the head, the resistive body being curable to obtain a resistor, the fluid pressure compensated compression means comprising:

power means for producing a compressional force over a fixed distance;

power transfer means for applying a compressional force coupled thereto to the resistive material in the die; and,

fluid pressure compensation means for coupling the compressional force produced by the power means to the power transfer means while limiting the compressional force to a predetermined pressure.

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4,024,615

## KNIFE HEAD, PARTICULARLY FOR POLYGONAL TURNING MACHINES

Karl Lieser, Wuppertal, Germany, assignor to Hermann Werner, Wuppertal, Germany

Filed July 8, 1976, Ser. No. 703,678
Claims priority, application Germany, Nov. 14, 1975, 2551183
Int. Cl.² B26D 1/12
U.S. Cl. 29—105 R 9 Claims

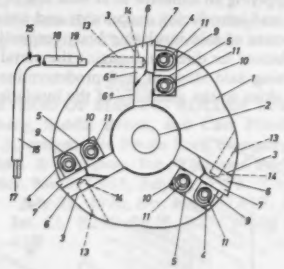
1. A knife head, particularly for polygonal turning machines, with knives held in plates and braceable in their operative position, the plates being adjustable so as to obtain a radial adjustability of the knives by means of an eccentric tool which is insertable in a bore in the knife head, comprising

a tool carrier formed with eccentric tool - insertion bores adapted to receive therein an eccentric tool formed with an eccentrically off set end,

a plurality of plate means radially adjustably mounted in said tool carrier for holding the knives, respectively,

each of said plate means including a rear wall formed with a recess therein, said rear wall defining a rear surface of said plate means,

said eccentric tool - insertion bores, respectively, being directed onto said rear surface of said plate means, respectively, and communicating with said recess,



said recess being formed in said rear wall laterally offset relative to said insertion bore communicating therewith, and adapted for insertion therein of the eccentrically off set end of the eccentric tool, whereby said plate means is radially adjustable to said carrier by a rotation of said eccentric tool.

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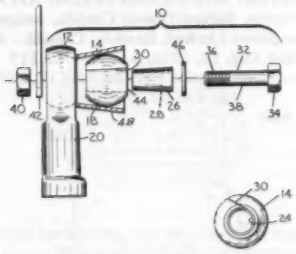
**4,024,616**

## SELF-ALIGNING BEARING WITH A SPLIT INNER MEMBER

**Albert R. McCloskey, Fairfield, Conn., assignor to Heim Universal Corporation, Fairfield, Conn.**

**Filed June 23, 1975, Ser. No. 589,201**
**Int. Cl.² B21D *53/10***
**U.S. Cl. 29—149.5 B** **8 Claims**



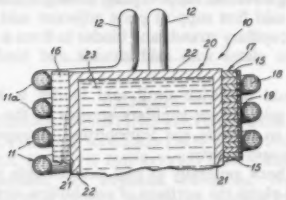
**1. A method of manufacturing a self-aligning spherical bearing comprising the steps of preforming an outer member having a concave spherical inner surface, preforming an inner member having a convex spherical outer surface generally complementary to the said concave spherical inner surface, said inner member being split to form a departure therethrough, said departure being tangential to a central hole provided in said inner member, reducing the outer diameter of said inner member, said reduction in said outer diameter being accommodated by said split in said inner member, inserting said inner member within said outer member, releasing said inner member such that it substantially regains its original dimensions whereby it is operationally supported within said outer member at said outer member's concave spherical inner surface.**

**4,024,617**

## METHOD OF APPLYING A REFRACTORY COATING TO METAL SUBSTRATE

**Harold E. McCormick, Ballwin, Mo., assignor to Ramsey Corporation, St. Louis, Mo.**

**Filed Mar. 6, 1973, Ser. No. 338,457**
**Int. Cl.² B23P *15/06***
**U.S. Cl. 29—156.63** **30 Claims**



**1. The method of obtaining an improved bond strength in shear at the interface between (1) a formed ferrous metal substrate having sections thereof of such small dimensions as to be readily heat deformable and (2) a refractory coating on said substrate, said method comprising the following steps;**

**making available to said interface a constituent capable of diffusion bonding the interface surfaces at temperatures within a range above the plastic state temperatures but below the molten state temperatures of said substrate, and**

**cyclicly applying inductive heating and cooling to said surfaces but substantially only to a depth equivalent to the thickness of said coating plus only several thousandths of an inch into said substrate to effect a temperature at said surfaces within the aforesaid range for a sufficient length of time to effect such diffusion bonding without substantial distortion of any of said sections of said formed ferrous metal substrate.**

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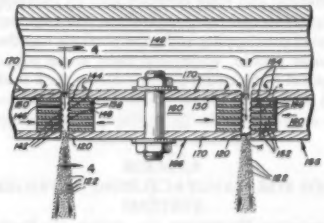
**4,024,618**

## METHOD OF FABRICATING GAS TRANSMITTING BODY FOR USE IN BUBBLE SHEARING

**Gilbert M. Kyrias, Littleton, Colo., assignor to FMC Corporation, Chicago, Ill.**

**Division of Ser. No. 441,573, Feb. 11, 1974, Pat. No. 3,927,152, and a continuation-in-part of Ser. No. 123,693, March 12, 1971, abandoned. This application Aug. 8, 1975, Ser. No. 603,048**
**Int. Cl.² B23P *15/00*; B01F *3/04***
**U.S. Cl. 29—157 C** **10 Claims**



**1. A method of fabricating a gas transmitting body for use in appraratus for diffusing fine gas bubbles into a body of liquid which comprises:**

**positioning a plurality of hollow capillary strands and binder across one face of a first support plate, said support plate being generally rectangular in shape and having a generally rectangular opening in the interior position thereof to**

provide an elongated O-shaped member having two sides adapted to form a part of the interior wall of a gas plenum and two sides adapted to form a part of the exterior wall of said gas plenum, said hollow strands being positioned in said first step substantially normal to the longitudinal axis of said support plate and to each of said two side walls, to extend across said rectangular opening and beyond the support plate on both exterior sides thereof;

positioning a second support plate having a similar shape to that of said first support plate adjacent said plurality of hollow capillary strands and binder to form a sandwich of said two plates with said strands and binder therebetween;

holding said sandwich until said binder is hardened to embed said hollow capillary strands in the binder as a matrix, to provide gas transmitting passages extending through said matrix;

trimming back generally to said exterior side walls of said support plates the portions of said hollow strands embedded in said matrix that extend outwardly beyond said side walls, to form a gas diffusing surface with capillary openings distributed across the same; and

severing the portions of said hollow stands embedded in said matrix that extend inwardly beyond said interior side walls of said support plates, to form the inlet ends of said gas transmitting passages.

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**4,024,619**

## METHOD OF MANUFACTURING A FLAT HEAT-EXCHANGER TUBE FROM THIN, FLEXIBLE METAL STRIP MATERIAL

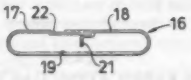
**Karl Gunnar Jonason, Vasteras, Sweden, assignor to Granges Essem Aktiebolag, Vasteras, Sweden**

**Filed Feb. 20, 1975, Ser. No. 551,412**

**Claims priority, application Sweden, Feb. 21, 1974, 7402317**

**Int. Cl.² B23P** *15/26*; **B21D** *51/16*, *53/04*

**U.S. Cl. 29—157.3 R** **2 Claims**




1. A method of making a flat heat-exchanger tube from a thin, flexible metal strip material having first and second longitudinal end edge portions, comprising the steps of bending a marginal portion of the first one of the longitudinal end edge portions of said strip to from a substantially right angle support flange to the remaining portion of said longitudinal edge portion, bending the remainder of said first longitudinal end portion of said strip into a position over and spaced apart from a central portion of said strip, bending the second one of said longitudinal end edge portions into an overlapping position in relation to said first longitudinal end edge portion, and soldering said overlapping end edge portions together to form a flat tubular profile, while said right angle support flange presses against said central portion during such soldering and to prevent collapse of the thin-walled tube when compressing forces are applied onto the flat surfaces of said complete tube.

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**4,024,620**

## METHODS FOR MANUFACTURING REFRIGERATING SYSTEMS

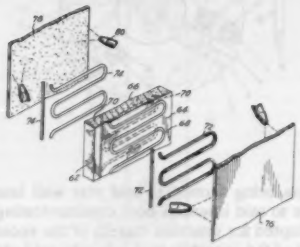
**Albert Torcomian, Havertown, Pa., assignor to Environmental Container Corporation, New York, N.Y.**

**Division of Ser. No. 444,875, Feb. 22, 1974, Pat. No. 3,902,332. This application June 11, 1975, Ser. No. 586,135**

**Int. Cl.³ B23P** *15/26*

**U.S. Cl. 29—157.3 C** **3 Claims**

1. In a method of manufacturing for a refrigerating system a wall structure which includes an intermediate insulating body having outer faces and a pair of outer metal skins which respectively have inner faces for respectively engaging said outer faces so that each outer face and inner face engaging the same forms a pair of faces, the step of forming in said outer faces of said intermediate insulating body grooves of a given depth having a configuration matching that of coils to be received in said grooves, then performing in a given sequence the steps of applying an adhesive to at least one of each of said pair of faces and introducing evaporator and condenser coils into said grooves of said insulating body respectively at said outer faces thereof for directly engaging the metal skins, then, after performing said steps in said predetermined sequence applying the skins to the assembly of the insulating body and



coils, and situating the assembled insulating body, coils, and skins in an evacuated atmosphere for eliminating any air bubbles in the adhesive while tightly pressing the metal skins against the insulating body and coils, said insulating body being compressible to a limited degree, and including the step of making said grooves initially of a lesser depth than that required to seat said coils in said grooves flush with said outer faces of said insulating body, and pressing said skins against the insulating body in said evacuated atmosphere with a force sufficient to compress the insulating body to increase the depth of said grooves while said coils become fully seated therein and said metal skins are pressed flush against said outer faces of said insulating body.

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**4,024,621**

## KEG ORIENTING AND TRANSFERRING APPARATUS

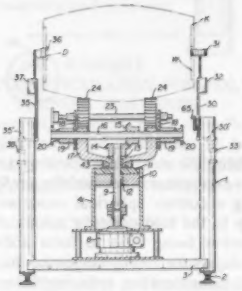
**Ernest J. Hodgetts, Spruce Grove, Canada, assignor to The Molson Companies Limited, Rexdale, Canada**

**Filed Aug. 10, 1976, Ser. No. 713,117**

**Claims priority, application Canada, May 12, 1976, 252376**

**Int. Cl.² B23P** *19/04*

**U.S. Cl. 29—822** **12 Claims**



1. Apparatus for orienting and transferring a keg having differently shaped ends, said apparatus including

a. a cradle receiving a keg with its central longitudinal axis disposed in a horizontal plane;

b. means for rocking said cradle from a keg-receiving posi-

tion, to a neutral position and from the latter to a keg-ejection position;

c. means for rotating the keg in the cradle about its said axis;

d. first and second means engagable with said keg ends, said first means being capable of removing an object from one end of said keg and said second means controlling said rotation; and

e. selectively operable means for rotating said cradle and said keg through 180° about a vertical axis.

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4,024,622

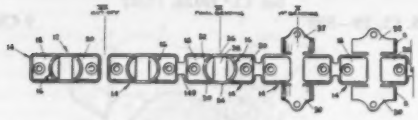
## METHOD OF MAKING ROLLER UNITS

Irving Feinberg, Saddle Brook, and Carl Friedrich, Union, both of N.J., assignors to Presto Lock Company, Division of Walter Kidde & Company, Inc., Elmwood Park, N.J.

Division of Ser. No. 597,755, July 21, 1975. This application July 22, 1976, Ser. No. 707,677

Int. Cl.² B21D *51/16*; B23P *17/02*

U.S. Cl. 29—417 15 Claims



1. A method of making a roller unit which comprises forming from a metal sheet a base and a pair of wings integral with said base and extending outwardly of said base from opposite edges thereof, and forming said wings into a shell substantially perpendicular to said base by bending said wings relative to said base at said edges and by making each wing substantially U-shaped with arms extending toward corresponding arms of the other wing and overlapping said base.

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4,024,623

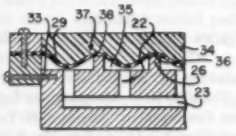
## MANUFACTURE OF ISOSTRESS CONTOURED DIES

Leslie Charles Kun, Williamsville, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 372,339, June 21, 1973, Pat. No. 3,924,441, Division of Ser. No. 189,659, Oct. 15, 1971, Pat. No. 3,757,856. This application Nov. 24, 1975, Ser. No. 634,652

Int. Cl.² B23P *17/04*

U.S. Cl. 29—421 R 12 Claims




1. A method for making a die for use in fabricating isostress contoured sheets wherein said die has an isostress contoured surface with spaced apart unidirectional projections comprising the steps of:

a. fabricating a block having on its surface multiple vertically projected supports and upwardly extending sides around the edges of said block so as to provide a cavity which contains said vertical supports, said supports forming a pattern and being dimensionally sized to correlate to the pattern and size of the wall-supporting projections desired in an isostress contoured surface;

b. tensionally securing a flexible material across the top of said cavity so that it contacts, and is supported by, said vertically projected supports;

c. pneumatically deforming the flexible material so as to force the unsupported portion of said flexible material into the cavity while the vertically projected supports prevent deflection of the supported portion of said flexible material contacting said supports thereby causing the flexible material to assume an isostress contour having substantially uniformly disposed unidirectional projections;

d. depositing and curing a form setting material against the pneumatically deformed flexible material;

e. discontinuing the pneumatic deformation; and

f. removing the cured material having an isostress contoured surface with spaced apart unidirectional projections.

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4,024,624

## CONTINUOUS CASTING METHOD FOR THE PRODUCTION OF ROLLED LOW CARBON STEEL PRODUCTS WITH IMPROVED FORMABILITY

James G. Bassett, Jr., Franklin Township, Westmoreland County, and Saul Gilbert, Pittsburgh, both of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

Filed Mar. 31, 1976, Ser. No. 672,099

Int. Cl.² B22D *27/20*

U.S. Cl. 29—527.7 4 Claims

1. In the manufacture of thick steel sheet product consisting essentially of, in weight percent, 0.01 to 0.15% C, 0.2 to 0.6% Mn, 0.01 to 0.10% Si and 0.015% max. Al, said product being produced by the continuous casting of a steel melt to produce a cast strand, thereafter rolling said strand only to the extent required to produce said thick sheet product, said product containing an undesirable degree of stringer-type inclusions resulting in poor formability,

the improvement for modifying the inclusion morphology and enhancing the formability thereof, which comprises introducing Mg into said melt, in an amount of ¼ to 1 lb. per ton of steel, said amount being effective to significantly reduce both the total inclusion area, and the percentage of continuous, aligned stringer-type inclusions present.

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4,024,625

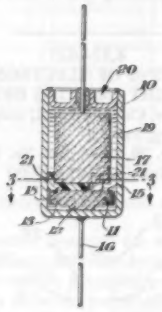
## WET PELLET ELECTROLYTIC CAPACITOR METHOD

Walter F. England, Williamstown, Mass., assignor to Sprague Electric Company, North Adams, Mass.

Filed May 28, 1975, Ser. No. 581,511

Int. Cl.² H01G *9/00*

U.S. Cl. 29—570 5 Claims




1. In the method of assembling a wet pellet-type polar electrolytic capacitor the steps of providing a porous body of sintered particles of a valve metal, inserting said body into a can having an inner surface of said valve metal and closed at one end, welding said body to the inside bottom of said can, forming a dielectric film of an oxide of said valve metal on said surface and the pores of said body.

4,024,626

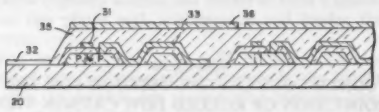
**METHOD OF MAKING INTEGRATED TRANSISTOR MATRIX FOR FLAT PANEL LIQUID CRYSTAL DISPLAY**

Alex M. Leupp, Costa Mesa; Lewis T. Lipton, Olivenhain, both of Calif., and Hans G. Dill, Marin-Neuchatel, Switzerland, assignors to Hughes Aircraft Company, Culver City, Calif.

Division of Ser. No. 530,586, Dec. 9, 1974, abandoned. This application Feb. 18, 1976, Ser. No. 659,184

Int. Cl.² B01J 17/00

U.S. Cl. 29—571 2 Claims




1. A method for constructing a transistor/capacitor array for driving a liquid crystal material, said method comprising the steps of:

a. providing an insulating substrate having a thin layer of monocrystalline silicon formed on one surface thereof;

b. etching said silicon layer into a pattern forming a plurality of isolated vertical arrays, each vertical array including a pair of elongated members, each having a plurality of lateral extensions;

c. masking an intermediate portion of each extension on one elongated member of each array and doping the unmasked portions of said arrays, thereby forming:

1. spaced-apart source and drain regions in the lateral extensions on said one elongated member of each array; and

2. conductive bottom capacitor plates of the lateral extensions on the other elongated member of each array;

d. growing an insulating layer over essentially all of the monocrystalline silicon;

e. exposing each said source region through an individual opening formed above it in said insulating layer;

f. forming a conductive layer over said insulating layer; and

g. etching said conductive layer into a pattern forming:

1. a plurality of horizontal gate buses and gate electrodes integral therewith, each of said gate electrodes extending over a respective one of said gate regions; and

2. a plurality of discrete top capacitor plates, respective ones of said top capacitor plates overlying a corresponding one of said bottom capacitor plates and extending through one of said openings to make contact with a corresponding one of said exposed source regions.

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4,024,627

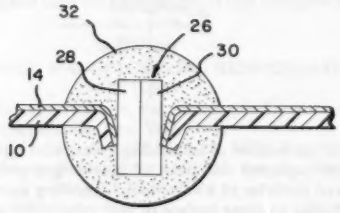
**PACKAGE MOUNTING OF ELECTRONIC CHIPS, SUCH AS LIGHT EMITTING DIODES**

Larry Ronald Stauffer, Camp Hill, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Apr. 29, 1974, Ser. No. 465,382

Int. Cl.² B01J 17/00

U.S. Cl. 29—588 6 Claims




1. A method for mounting electronic chips, such as light emitting diodes and the like, in flat flexible circuitry having a patterned circuit of conductive material bonded to a single layer of flexible insulated substrate comprising the steps of:

forming a slot in a portion of said circuitry and said substrate thereunder and dispaceable portions of said circuitry and substrate adjacent opposite sides of said slot, and

inserting an electronic chip, whose thickness is greater than the width of said slot, edgewise into said slot to displace said portions of said circuitry on both sides of said slot causing said portions to resiliently engage the respective sides of said chip forming electrical connection therewith and support therefor.

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4,024,628

**PROCESS FOR MANUFACTURING A TWO-POLE SOLID ROTOR**

Donald M. Crites, 7223 Timber Lane, Falls Church, Va. 22046

Filed June 22, 1976, Ser. No. 698,663

Int. Cl.² H02K 15/02

U.S. Cl. 29—598 9 Claims

1. A process for manufacturing a two-pole solid rotor comprising the steps of

a. pre-forming a rotor blank with cavities therein from a non-magnetic metal,

b. machining the rotor blank to define a pair of cavities and a pair of end cap receiving surfaces,

c. fitting end caps on the end cap receiving surfaces,

d. filling the pair of cavities by inserting magnetic material therein,

e. machining the rotor to finished size.

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4,024,629

**FABRICATION TECHNIQUES FOR MULTILAYER CERAMIC MODULES**

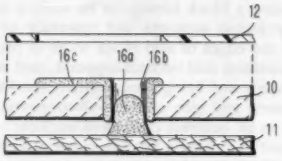
Jean Marie Lemoine, St. Michel sur Orge, France, and Jean Luc Mathis, Fishkill, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 26, 1975, Ser. No. 635,567

Claims priority, application France, Dec. 31, 1974, 74.43622

Int. Cl.² B41M 3/08

U.S. Cl. 29—625 11 Claims




1. A method of metallizing the surface of through-holes in an insulating sheet comprising the steps of:

a. placing said sheet onto an absorbent carrier;

b. filling said through-holes with a metallization paste con-

taining a metal component dispersed in an organic solvent, which solvent is absorbable by said carrier;

c. stripping said sheet from said carrier such that the center part of said paste which fills said through-holes adheres to and is removed along with the carrier to leave a thin layer of paste on the inner surface of said through-holes; and

d. heating said sheet to convert said paste to the metal state.

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**4,024,630**

**MACHINE FOR MANUFACTURING CABLE FORMS**

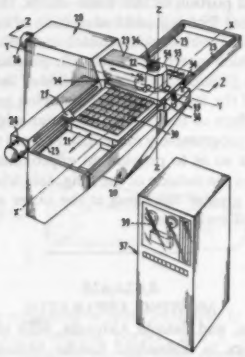
**Carl Johan Alexander Wahren, Doncaster East, and Leon Alexandra Merdy, Canterbury, both of Australia, assignors to L. M. Ericsson Pty. Ltd., Australia**

**Continuation of Ser. No. 465,144, April 26, 1974, abandoned. This application Mar. 12, 1975, Ser. No. 557,609**

**Claims priority, application Australia, Apr. 26, 1973, 3080/73**

**Int. Cl.² H01B *13/06, 13/02***

**U.S. Cl. 29—624** **28 Claims**



1. A machine for manufacturing cable forms, said machine including a plurality of holding clutches for securely holding the ends of wires being used to make the cable form, said holding clutches being arranged in spaced relationship to simulate the relatve spacing of terminals to which said wires will, in use, be connected, wire feed means moveable automatically relative to said clutches for introducing the end of a pre-selcted wire into a predetermined one of said clutches and routing said wire along a predetermined path to a further predetermined one of said clutches, cutting and stripping blades for automatically cutting said wire and stripping the insulation adjacent the cut end prior to said introducing and, after said routing, for cutting the wire and stripping the insulation from adjacent the end of the routed wire, returning means for rotating and introducing said last mentioned end into said further clutch, and control means for controlling the operation of said machine.

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**4,024,631**

**PRINTED CIRCUIT BOARD PLATING PROCESS**

**Alphonso W. Castillero, Upland, Calif., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Nov. 24, 1975, Ser. No. 634,977**

**Int. Cl.² B41M *3/08***

**U.S. Cl. 29—625** **34 Claims**

1. A method for producing printed circuit boards comprising:

a. preparing the board with exposed copper in the circuit pattern desired,

b. plating nickel over the exposed copper,

c. etching away any copper not covered by nickel,

d. applying a solder mask to expose only nickel areas to be covered with solder,

e. activating the nickel to accept solder, and

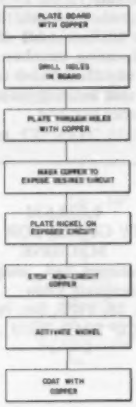
PLATE BOARD WITH COPPER
DRILL HOLES IN BOARD
PLATE THROUGH HOLES WITH COPPER
MASK COPPER TO EXPOSE DESIRED CIRCUIT
PLATE NICKEL ON EXPOSED CIRCUIT
ETCH NON-CIRCUIT COPPER
ACTIVATE NICKEL
COAT WITH COPPER

f. applying solder to the nickel.

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**4,024,632**

**DRAWING IN TOOL**

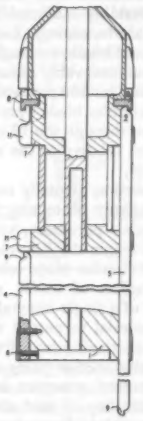
**Sydney David Inglis, Beverly Hills, Australia, assignor to James N. Kirby Limited, Revesby, Australia**

**Filed June 21, 1976, Ser. No. 698,159**

**Claims priority, application Australia, June 16, 1975, 2371/75**

**Int. Cl.² H02K *15/06***

**U.S. Cl. 29—736** **5 Claims**



1. A device for inserting pre-wound coils into grooves of stators comprising:

a. a stripper member mounted for movement through a stator, said stripper member including a plurality of equally spaced radially extending projections positioned about periphery of the stripper member, each said projection being positioned across from a stator groove;

b. lamella members located in planes passing between the projections of the said stripper member and extending in a direction parallel to the direction of relative movement between the stripper member and the stator;

c. a locating member, which is stationary relative to the movement of the stripper member through said stator, the peripheral cross-sectional configuration of part of which corresponds to that of the said stripper member, said

locating member being adapted to receive the ends of the lamella members, and

d. a locking ring member adapted to cooperate with said locating member to lock ends of lamella members in position on the locating member; characterized in that the ends of each lamella member is adapted to be locked into position on said locating member by means of said locking ring member.

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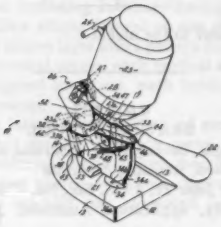
**4,024,633**

## SIMPLIFIED SAFETY GUARD FOR A CLOTH CUTTING MACHINE

**Robert G. Stucker, Sunman, Ind., assignor to The Wolf Machine Company, Cincinnati, Ohio**

**Filed Nov. 28, 1975, Ser. No. 635,579**
**Int. Cl.² B26B** *25/00, 29/00*
**U.S. Cl. 30—273** **10 Claims**



1. A simplified safety guard for a cloth cutting machine of the vertically oriented circular blade type, said machine including a base and a standard fixed to said base, said standard having said blade rotatably mounted thereon in a vertical plane, and said standard mounting a handle that extends generally rearwardly of said blade, said safety guard comprising

a fixed guard section removably mounted to said machine's standard, said fixed section protecting substantially three quarters of said circular blade's periphery from about the 9 o'clock position through the 12 o'clock position to the 6 o'clock position relative to the machine's right-to-left direction of travel,

a movable guard section pivotally connected to said fixed section for selectively protecting the fourth quarter of said circular blade's periphery, said pivotal connection being positioned within the 12 o'clock through 3 o'clock quadrant of said circular blade relative to the machine's right-to-left direction of travel, said movable section being fabricated of a single integral structural element of a transparent material to permit viewing of the cutting pattern on a cloth stack adapted to be cut by said machine, said movable section being structured so that said entire single element structure is positioned above a phantom diameter line of said circular blade disposed parallel to said machine's base when said movable section is fully opened, and said movable section including

a. a U-shaped nose at the front end thereof adapted to embrace said blade's edge in the fourth quarter of said circular blade's periphery when said movable section is in the home position, and

b. a thumb lip adjacent the machine's handle at the rear end of said movable section for use by the machine's operator to open the movable section when desired, and

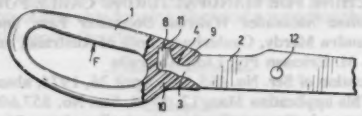
fastening means adapted to mount said fixed section to said machine, said fastening means being operable to allow removal of said fixed section from operative engagement with said machine, removal of said fixed section from said machine effecting removal of said simplified safety guard to allow changing of said circular blade.

**4,024,634**

## FASTENING ARRANGEMENT FOR PLASTICS HANDLES OF SCISSORS AND EQUIVALENT

**Erkki Olavi Lindén, Bilinas, Finland, assignor to Oy Fiskars AB, Helsinki, Finland**

**Filed June 7, 1976, Ser. No. 693,609**
**Claims priority, application Finland, June 11, 1975, 751742**
**Int. Cl.² B26B** *13/20*
**U.S. Cl. 30—341** **2 Claims**




1. A fastening arrangement for plastics handles in cutting tools, such as scissors and pliers, comprising two blade-shafts pivotably fastened to each other, the handles being die-cast around the end portion of the blade-shafts, the arrangement comprising a tang forming said end portion of each blade-shaft and formed at its root end with a notch at the inner edge of the blade-shaft, which notch is filled with plastics to procide a relatively thick plastics layer on the inside of the blade-shaft at the root end of the tang, and said tang being generally curved so that the surface of the tang at the outer edge of the blade-shaft becomes progressively more distant from the direction of said outer edge so as to provide an approximately triangular plastics layer on the outside of the tang, said triangular plastics layer being of greater thickness at the outer end of the tang than at the root end thereof.

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**4,024,635**

## MOWING APPARATUS

**Hitoshi Mizuno, and Satoshi Akiyama, both of Odawara, Japan, assignors to Kabushiki Kaisha Shikutani, Odawara, Japan**

**Filed Jan. 21, 1976, Ser. No. 651,192**
**Claims priority, application Japan, July 4, 1975, 50-82550**
**Int. Cl.² A01D** *55/18*
**U.S. Cl. 30—276** **3 Claims**

1. A mowing apparatus comprising, in combination, an output axis and rotary power means mounted on supporting means, said output axis being rotatably connected with said rotary power means, a rotary disk-like casing detachably and coaxially secured to said output axis for rotation therewith in a cutting plane, said rotary disk-like casing including upper and lower disk members, said upper and lower disk members defining a chamber therebetween, at least one guide port provided at the periphey of the disk-like casing, said upper disk member having a circular depending wall at its periphery, said circular depending wall being formed with a small inward projection in each position where said guide port is provided, said lower disk member having an outer diameter smaller than the inner diameter of said circular depending wall and provided with inward recesses adapted for fitting engagement with each of said inward projections provided in said circular depending wall, whereby said lower disk member together with the coil of said string is contained within the hollow cylindrical inside of said upper disk member and locked for rotation therewith, at least one flatly coiled cutting string made of a high polymer synthetic material disposed in said chamber, a fixing member detachably secured to said output axis for fixing said coiled cutting string between said upper and lower disk member, said fixing member consisting of a bolt element detachably secured to said output axis and a nut element adapted for threading engagement with said bolt element, said bolt element having an upper enlarged polygonal head adapted for fitting engagement with a center polygonal recess provided in said upper disk member and a lower bolt adapted to extend through a center bore below said cen-

ter polygonal recess in said upper disk member for threading engagement with said nut element, said nut element being shaped in the form of a cap, whereby upon the fastening of said nut element onto said bolt, said upper and lower disk members together with the coil of said string will be tightly fixed and locked for rotation with said output axis, said cutting string extending through said guide port out of said rotary disk-like casing to form a cutting flail with an effective working length in said cutting plane during rotation, said chamber defined by said upper and lower disk members being smaller than the thickness of said cutting string, each coil of said cutting string being connected with the adjacent coils thereof so that when the free end is pulled out the outermost coil can be stripped therefrom without disjoining the entire coil.

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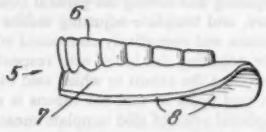
4,024,636

## DENTURES

Ralph W. Colpitts, St. Louis, Mo.; Kurt C. Frisch, Grosse Ile, and Adolfas Damusis, Southfield, both of Mich., assignors to Polythetics, Inc., St. Louis, Mo.

Filed July 11, 1975, Ser. No. 595,171
Int. Cl.² A61C 13/00
U.S. Cl. 32—2 9 Claims




1. A denture consisting of teeth anchored in a gum member comprising a tooth-holding portion and a mouth-engaging portion, the tooth-holding portion being composed essentially of hard non-hydrophilic polyurethane elastomer having a hardness of not less than about Shore D 40, and the mouth engaging portion being composed essentially of soft non-hydrophilic polyurethane elastomer having a hardness of not greater than about Shore A 65, said tooth-holding portion and said mouth-engaging portion being integrally chemically bonded into a unitary mass.

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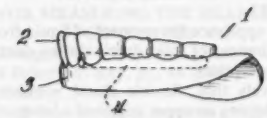
4,024,637

## DENTURES AND PROCESS FOR MAKING THE SAME

Ralph W. Colpitts, St. Louis, Mo., assignor to Polythetics, Inc., St. Louis, Mo.

Filed July 11, 1975, Ser. No. 595,035
Int. Cl.² A61C 13/00
U.S. Cl. 32—2 9 Claims



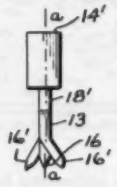

1. A denture comprising teeth consisting essentially of hard non-hydrophilic polyurethane elastomer having a hardness of not less than about Shore D 40, imbedded in and chemically bonded to a gum member consisting essentially of soft non-hydrophilic polyurethane elastomer having a hardness of not greater than about Shore A 65.

4,024,638

## WIDE VENT DENTAL IMPLANTS

Leonard I. Linkow, 30 Central Park South, New York, N.Y. 10019, and Alfred E. Edelman, 2723 Federal St., Camden, N.J. 08105

Continuation-in-part of Ser. No. 480,367, Aug. 17, 1965, Pat. No. 3,479,222. This application Feb. 24, 1969, Ser. No. 804,738
Int. Cl.² A61C 13/00
U.S. Cl. 32—10 A 8 Claims




1. A dental implant comprising at least one head portion, and at least one flat, thin blade portion connected to the head portion by a reduced neck portion, said blade portion having a sharpened bottom edge adapted to incise the jaw bone as the implant is driven into the bone by pressure applied to the head portion. said bottom edge being serrated.

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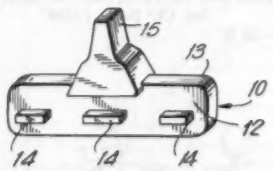
4,024,639

## BONE IMPLANTS AND METHOD FOR INSERTING THE SAME

Fredric M. Weiss, Suffern; David P. Malkin, Bluepoint, both of N.Y.; James Pugh, Edgewater, N.J., and Charles Weiss, Newton, Mass., assignors to End-Dent, Inc., Suffern, N.Y.

Filed Feb. 25, 1975, Ser. No. 552,789
Int. Cl.² A61C 13/00
U.S. Cl. 32—10 A 11 Claims




1. A dental implant for insertion into a cavity in bone structure, the implant comprising, in combination:

a support member having a pair of opposed surfaces, the support member including a plurality of generally planar lateral projections extending in a transverse direction from said surfaces, the overall dimensions of the support member being respectively less than the corresponding dimensions of the cavity;

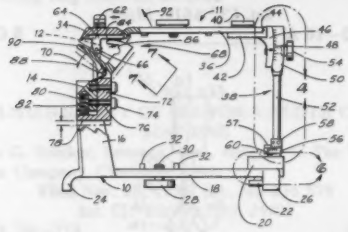
at least one pin means in rigid relationship with the support member and being of a length sufficient to protrude from the cavity, the lateral projections on said support member lying in a plane which is perpendicular to the axis of the pin means and which is transverse of the plane in which said axis of the pin means lies, whereby the plane of said projections intersects said axis of the pin means at a right angle;

and a body of nontoxic filler material adapted to be disposed within the cavity around the support member for permanently preventing all contact between the support member and the bone structure.

## 4,024,640
## DENTAL ARTICULATOR

Niles F. Guichet, 320 Olympic Place, Anaheim, Calif. 92806

Filed Feb. 27, 1976, Ser. No. 661,935
Int. Cl.² A61C 11/00
U.S. Cl. 32—32 20 Claims



1. A dental articular comprising:

a lower frame member posteriorly bearing a pair of spaced-apart condylar elements with a condylar axis therebetween;

an upper frame member pivotally carried thereon by spaced-apart fossa elements resting on said condylar elements;

latching means including:

pin means carried on one of said upper frame member coaxially to said condylar axis;

hook arm means pivotally carried on said lower frame member whereby said hook arm means can be pivoted over said pin means to exert a downward force on said upper frame member; and

detenting recesses on the undersurface of each of said fossa elements to seat their respective condylar elements.

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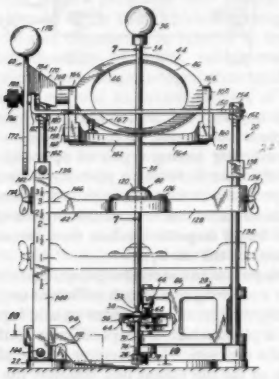
## 4,024,641
## INSTRUMENT FOR DRAWING GEOMETRIC FIGURES

Joseph Chudner, 2907 Brighton 8th St., New York, N.Y. 11235

Filed Oct. 16, 1975, Ser. No. 623,125
Int. Cl.² B43L 11/04
U.S. Cl. 33—30 B 12 Claims



1. In an instrument for producing on the surface of a sheet material a given geometric figure having a preselected maximum length and a preselected maximum width, base means adapted to rest on the surface of the sheet material during formation of the given geometric figure thereon, marking means adapted to carry an inscribing member which has a tip for engaging the surface of the sheet material for inscribing the given figure thereon, connecting means operatively connected with said base means and marking means for supporting said marking means while providing for said marking means complete freedom of movement with respect to said base means, elongated manually operable bar means having a lower end next to said marking means and an upper end distant therefrom and adapted to be manipulated by the operator, lower universal joint means connecting said lower end of said bar means to said marking means for providing a universal joint connection between said marking means and bar means at the lower end of the latter, upper universal joint means surrounding and engaging said bar means between said upper and lower ends thereof and being freely shiftable longitudinally of said bar means for providing at a selected location longitudinally of said bar means a point about which said bar means can be manually turned in all directions, joint-adjusting means carried by said base means and operatively connected with said upper universal joint means for adjusting the elevation thereof with respect to said base means for determining the location of said point along said bar means, template means for guiding said bar means when the latter is manipulated by the operator during turning with respect to said point, said template means being situated along said bar means at an elevation different from said upper universal joint means and being formed with an opening through which said bar means extends, said template means having an inner peripheral edge defining said opening and having the general configuration of said given figure, and template-adjusting means also carried by said base means and operatively connected with said template means for adjusting the latter with respect to said bar means for controlling the extent to which said bar means can be tilted about said point as said bar means is moved along said inner peripheral edge of said template means to provide by way of said marking means said given figure on said surface of said sheet material, the adjustment of said upper universal joint means and said template means by way of said joint-adjusting means and template-adjusting means determining the magnitude of the geometric figure produced on the surface of the sheet material and the relationship between the length and width thereof, said template-adjusting means supporting the template means for tilting movement about a substantially horizontal axis and said inner peripheral edge of said template means being situated on one side of said horizontal axis at an elevation lower than said horizontal axis and at the opposite side of said horizontal axis at an elevation higher than said horizontal axis, and said template adjusting means including a compensating means for changing the location of said horizontal axis depending upon the inclination of said template means to compensate for inaccuracies which otherwise would occur if said horizontal axis were to remain stationary.

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## 4,024,642
## DENTAL APPLIANCE

Dan Zorovich, Allentown, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

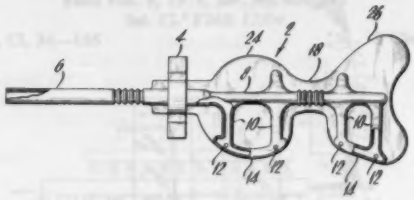
Filed Aug. 26, 1975, Ser. No. 607,861
Int. Cl.² A61C 17/04
U.S. Cl. 32—33 10 Claims

1. A dental appliance for removal of liquid from the mouth and for containment of solid debris during dental work on a tooth which comprises:

A. a relatively thin, flexible shield member, said shield member having an upper edge and a lower edge, a narrow central portion adapted to be placed over the gum behind said tooth, a first wider terminal portion adapted to be placed on the lingual side of said tooth, and a second wider terminal portion adapted to be placed on the buccal side of said tooth;

B. a suction tube connecting with the end of said first wider terminal portion of said shield member;

C. a system of suction channels within said shield member and terminating in apertures along only said upper and lower edges of said shield member, said suction channels connecting to a drain channel having egress through said



suction tube whereby liquid is removed from both lingual and buccal sides of said tooth; and

D. a bite block carried on said suction tube, whereby the appliance is secured in the mouth.

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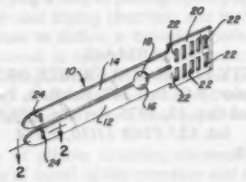
**4,024,643**

## DENTAL MATRIX RETAINER

Harry H. Eisenberg, 201 W. Springfield, Champaign, Ill. 61820

Filed Aug. 25, 1975, Ser. No. 607,287
Int. Cl.² A61C 5/12
U.S. Cl. 32—63 13 Claims



1. A dental matrix retainer, comprising:

a first thin band for looping about the axially inner or gingival contour of a tooth, said first band having a notch formed in the edge thereof facing the outer or cusp portion of the tooth; and

a second thin band for looping about the axially outer or cusp contour of the tooth said second band having a complementary cooperative notch formed in the edge thereof facing the inner or gingival portion of the tooth and complementing and cooperating with the notch in said first band when the two bands are adjacent each other to define a unitary matrix with said notches forming a singular aperture through which filling material may protrude into contact with an adjacent tooth, whereby the two bands can be removed longitudinally from between said teeth after a cavity is filled without disturbing said contact.

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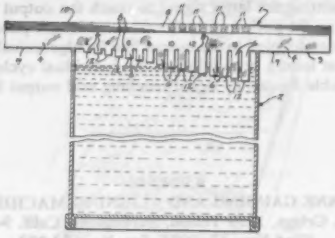
**4,024,644**

## GAUGE FOR MEASURING THE HEADSPACE IN A CONTAINER

William P. Koenig, 470 N. Powers St., Port Washington, Wis. 53074, and Robert W. Ray, Jr., 4676 N. 104th St., Milwaukee, Wis. 53225

Filed Sept. 8, 1975, Ser. No. 611,217
Int. Cl.² G01F 23/00, 23/04
U.S. Cl. 33—126.7 R 9 Claims

7. A gauge to be supported on the upper edge of a container for determining the headspace in the container above the level of liquid therein, comprising a body of transparent material having a base portion adapted to rest on the upper edge of the container, a series of spaced apart probes extending downwardly from the base portion and adapted to extend into the interior of the container, said probes having different lengths and disposed in a common plane, the spacing between adjacent probes being sufficient to receive the side wall of the container, and a flat elongated surface disposed on the upper



portion of said body and intersecting said plane at an acute angle, said probes and said body being formed such that under normal lighting conditions darkened spots appear on said flat surface above the position of the probes that are in contact with the liquid in the container to thereby provide a visual indication of the liquid level in the container.

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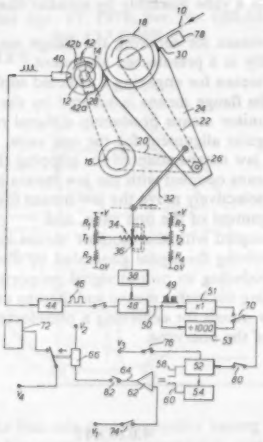
**4,024,645**

## METHOD AND APPARATUS FOR MEASURING LENGTH

Donald Beresford Giles, Angmering, England, assignor to K. D. G. Instruments Limited, Bath, England

Filed Aug. 1, 1975, Ser. No. 601,204
Claims priority, application United Kingdom, Aug. 14, 1974, 35868/74
Int. Cl.² G01B 19/04
U.S. Cl. 33—129 17 Claims



1. An apparatus for continuously measuring the length of linear material during winding of the material onto a rotating core to form a package, said apparatus comprising:

a member mounted for movement with increasing package diameter of said package as it is being wound,

means coupled to said member for forming a continuous electrical signal having its frequency at all times proportional to the instantaneous diameter of the package being wound and independent of the speed of winding,

means mounted adjacent said core for detecting rotation of said core,

means connected to said detecting means for forming at least one pulse of fixed length for each revolution of the

package to form a pulse train having a frequency independent of package diameter,

an output line,

a gating means operatively connected with said first and second means and with said output line for receiving the fixed length pulses and the variable frequency signal and permitting the latter signal to reach the output line only during the period of each said fixed length pulse, and

a counter coupled to the output line for algebraically counting at least a proportion of the individual cycles of said variable frequency signal reaching said output line.

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**4,024,646**

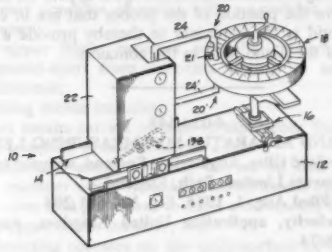
## VANE GAUGING AND ALIGNING MACHINE

**Elmer L. Griggs, 1720 Toledo, Burlingame, Calif. 94010**

**Filed Nov. 17, 1975, Ser. No. 632,272**

**Int. Cl.² G01B 7/28**

**U.S. Cl. 33—174 P** **18 Claims**



1. A vane gauging and bending apparatus for aligning vanes supported in a vane assembly by suitable flange means, comprising

support means for securing the flange means of the vane assembly in a preselected alignment,

monitor means for engaging a selected surface of one vane while its flange means is secured by the support means, the monitor means producing a signal representative of the angular alignment for the one vane,

movable jaw means adapted for gripping the one vane,

motor means coupled with the jaw means and being operable to selectively move the jaw means for changing angular alignment of the one vane, and

means coupled with the monitor means and motor means for receiving the signal generated by the monitor means and producing an output signal proportional thereto for operating the motor means and thereby causing motion of the jaw means for achieving a preselected angular alignment of the one vane.

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**4,024,647**

## TEMPERATURE CONTROLLED HEATER TRAY

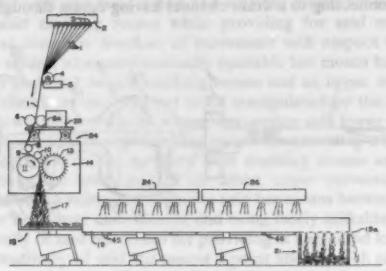
**William L. Schaefer, Gibsonia, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Jan. 20, 1976, Ser. No. 650,817**

**Int. Cl.² F26B 7/00**

**U.S. Cl. 34—12** **5 Claims**

1. In the method of drying wet chopped glass strand having a binder thereon which may be overheated and overcured comprising passing said strand along a first vibrating conveyor having no heaters located thereabove, passing said strand along a second, heated, insulated vibrating conveyor having at least two heaters located thereabove and heating the wet chopped glass strand to thereby dry it, the improvement comprising maintaining sufficient heat output from at least one of said heaters in response to temperature fluctuations of said second conveyor to dry and cure said wet chopped glass



strand while preventing overheatng and overcuring of said wet chopped glass strand during said drying.

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**4,024,648**

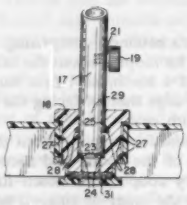
## SAFETY FLASK FOR FREEZE DRYING

**Charles E. Bender, P.O. Box 247, Fairfield, Pa. 17320**

**Filed Oct. 22, 1975, Ser. No. 624,606**

**Int. Cl.² F26B 13/30, 25/14**

**U.S. Cl. 34—92** **9 Claims**



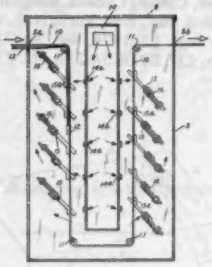
1. A vessel assembly for freeze drying formed of materials resistant to chemical, thermal and shock action comprising a sample container open at one end, a cover assembly disposed over said opening said cover assembly having a central opening with a shoulder formed therein in communication with said container a cylindrical adapter disposed in said opening having a central passageway extending therethrough, said adapter having an enlarged head and a reduced bottom portion extending into said central opening and said adapter having a shoulder adjacent its reduced portion resting on said central opening shoulder, recess means on the exterior middle portion of said adapter and sealing means disposed in them to form a seal with said central opening, other recess means on the interior of said passageway with sealing means disposed therein, a connector tube for communication with a vacuum source extending into said passageway adjacent a shoulder formed therein and bearing against sealing means on said passageway shoulder, an annular retainer cap inserted in said central opening, a filter disposed in said cap sandwiched between perforated support means, and vacuum release means inserted through the wall of said connector tube including a threaded member with an o-ring disposed thereon to provide a seal for said opening.

4,024,649

## PAPER RETARDING CONTROL MECHANISM FOR PHOTOGRAPHIC DRYER

Alfred J. Gaskell, Hopkins, Minn., assignor to Pako Corporation, Minneapolis, Minn.

Filed Feb. 9, 1976, Ser. No. 656,242
Int. Cl.² F26B *13/04*
U.S. Cl. 34—155 5 Claims



1. A paper retarding control mechanism for a photographic paper dryer of the type which includes a drying chamber having a central air supply and distribution plenum housing formed therein, said plenum having substantially vertical side walls with a plurality of openings therein for discharging drying air laterally outwardly therefrom; and a transport conveyor for carrying a strip of photographic paper material to be dried through said drying chamber, and including a plurality of roller means to define a transport path having portions thereof positioned in opposed relation to said plenum openings so that drying air discharged from said plenum is directed against a strip of material being carried along said opposed portions of said transport path, said paper control mechanism comprising,

a plurality of pliable retarding elements inclined in the direction of travel of the conveyor and disposed in vertically spaced apart relation to each other and in opposed outwardly spaced relation to the side wall of plenum with said opposed portions of the conveyor and paper strips being carried thereby being disposed between the plenum and the retarding elements and the air discharged through the openings in the plenum side walls deflecting the paper into engagement with said retarding elements to maintain the paper in generally upstanding relation as it is transported downwardly by the transport conveyor of the dryer.

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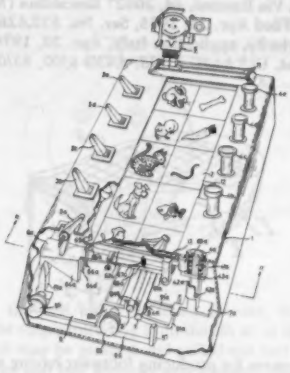
4,024,650

## EDUCATIONAL TOY

Hsing-ching Liu, and Lan-dih Liu, both of 3F, No. 213, Chung Ching North Road Sec. 4, Taipei, China /Taiwan

Filed Jan. 30, 1976, Ser. No. 653,789
Int. Cl.² G09B *3/10*
U.S. Cl. 35—9 R 9 Claims

1. An educational toy comprising a case, a plurality of changeable question and answer combination cards with notched longitudinal edges, a series of question actuating means and a series of corresponding answer actuating means, an indication mechanism composed of an affirmative indicator and a negative indicator, a series of question setting plates horizontally displaceable arranged beneath the corresponding question actuating means and having at their undersides at least two ribs with different inclined bottom surfaces, a series of answer setting plates connected at the bottoms of the corresponding answer actuating means and vertically displaceable together therewith, a movable board having a series of wedge-shaped posts along one side to be in selective cooperation with one of the said inclined ribs to set the position of the board and a series of supports laterally extended away from the board, and a pair of rods transversely supported at the free ends of the said supports and each having radially extended a



series of L-shaped levers to be in selective cooperation with the said answer setting plates so as to raise up either the said affirmative indicator or the said negative indicator.

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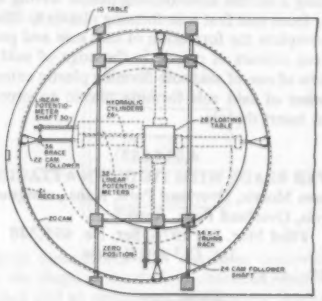
4,024,651

## VARIABLE FEEL SIDE STICK CONTROLLER

David B. Lantrip, Oxnard, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 27, 1976, Ser. No. 680,651
Int. Cl.² G09B *9/08*
U.S. Cl. 35—12 S 18 Claims



1. A variable feel side stick controller having a side stick

a. floating table means gimbal mounted to said side stick for translating side stick motion to rectilinear motion in a Cartesian plane;

b. a plurality of hydraulic cylinders connected to said floating table;

c. cam means connected to said hydraulic cylinders for displacing hydraulic fluid in said plurality of hydraulic cylinders indicative of displacement of said side stick;

d. viscous dampening means for producing and regulating a feedback force at said side stick proportional to angular velocity of said side stick; and

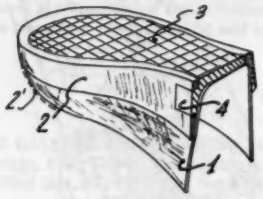
e. accumulator means for producing and regulating a feedback force at said side stick which is proportional to displacement of said side stick.

**4,024,652**

## METHOD FOR FORMING INSERTS IN SHOE SOLES AND THE PRODUCT OBTAINED

**Fosco Brilli, Via Rusconi, 44, 20027 Rescaldina (Milan), Italy**

**Filed Apr. 28, 1975, Ser. No. 572,626**
**Claims priority, application Italy, Apr. 30, 1974, 22108/74**
**Int. Cl.² A43C *13/08*; A43D *9/00*, *65/00***
**U.S. Cl. 36—14** **5 Claims**




1. In a process for producing footwear having an upper and a plastic sole attached thereto by injection moulding, the sole comprising an edge portion and a bottom portion differing in colour with part of one of said portions extending into the other of said portion to form a differently coloured insert therein comprising the steps of:

a. Providing an open topped injection mold having its top closed by said upper and having its inner periphery comforming to the outer periphery of said sole,

b. Providing a movable member in the side walls of said mold having an inner service thereof conforming to a portion of the outer periphery of the edge of said sole, said member being movable to an extended position within said mold and to a retracted position with its inner surface conforming to the adjacent inner surface of the inside walls of said mold,

c. Injecting a first sole forming plastic material into said mold with said movable member in one of said positions to partially fill said mold,

d. Moving said movable member to the other of said positions, and

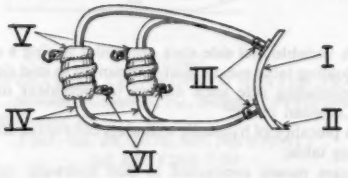
e. Injecting a second sole-forming plastic having a different colour from said first sole-forming plastic to fill said mold and complete the formation of said sole and provide two different colours of plastic in the edge of said sole with portions of one of said sole-forming plastic extending into the other of said sole-forming plastic to provide a coloured insert therein.

**4,024,653**

## BUMPER BLADE WITH TIE DOWN ATTACHMENT

**Caleb Ganeo Morris, Overland Park, Kans., assignor to Caleb G. Morris, Overland Park, Kans.**

**Filed Mar. 23, 1976, Ser. No. 659,328**
**Int. Cl.² E01H *5/04***
**U.S. Cl. 37—42 R** **1 Claim**



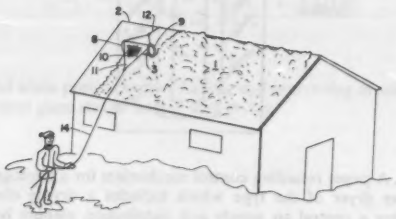

1. In combination with a vehicle having a bumper, a snow plow blade, a pair of tubular spaced apart upstanding U-shaped skid means, said skid means each having an upper and lower end detachably mounted to the rear of said blade, a protective bumper means slideable positioned on each skid means so as to be aligned with the height of said bumper, and rubber tie-down strap means having hook means for engaging said bumper, said tie-down strap means being wrapped around each of said bumper pad means whereby the snow plow blade is attached to said bumper to form a secure but independent suspension.

**4,024,654**

## ROOF SNOW SCOOP DEVICE

**Wayne M. Snyder, Castor, Canada, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed Sept. 13, 1976, Ser. No. 722,347**
**Int. Cl.² E01H *5/02*; A47L *13/02***
**U.S. Cl. 37—53** **2 Claims**




1. A roof snow scoop device for removing snow from a sloping roof, said snow scoop device comprising

a manual snow plow blade having a substantially C-type cross-section, a pair of spaced parallel substantially linear upper and lower edges and a pair of spaced opposite ends;

a pair of rings affixed to corresponding ends of the blade in a manner whereby the rings are in parallel planes substantially perpendicular to the blade and extend beyond the borders of said blade;

a substantially planar sheet member affixed to the rings at the upper edge of the blade;

first pulling means affixed to the blade intermediate the upper and lower edges on the convex surface thereof for manually pulling the device up the incline of a sloping roof whereby only the rings abut the roof thereby preventing the uprooting of shingles on the roof; and

second pulling means affixed to the planar sheet member for manually pulling the device down said incline thereby causing the lower edge of the blade to bite into snow on the roof whereby the blade pulls snow down said incline with it.

**4,024,655**

## CUTTING AND FEEDING MECHANISM FOR SUCTION INLET

**Karl Friedrich Schweitzer, D-5605 Hochdhl, Germany**

**Filed July 7, 1975, Ser. No. 593,506**
**Claims priority, application Germany, July 5, 1974, 2432286**
**Int. Cl.² E02F *3/92***
**U.S. Cl. 37—58** **3 Claims**

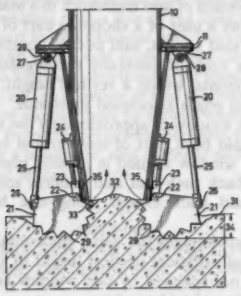
1. In a suction feed device for suction dredges, in combination:

a suction pipe defining an inlet opening near an end;

a pivot means secured to said pipe and forming two pivot points disposed near said opening on opposite sides of said pipe, said pivot means further including a shifting device operable for shifting said pivot points substantially parallel along the side of said suction pipe;

combined mechanical feeder and cutting means mounted with relation to said pipe and including two pairs of disk-like cutter and crusher tools having arcuate edges saw-toothed throughout, each said pair being secured to and partially rotatable about a corresponding one of said pivot points; and

means operable for rotating each tool about its pivot point to cut and crush and feed into said opening, material to be dredged.



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4,024,656

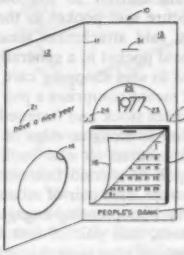
## GREETING CARD CALENDAR

Barbara Farnsworth, P.O. Box 141, Camden, N.Y. 13316

Filed Apr. 19, 1976, Ser. No. 678,203

Int. Cl.² G09D *3/04*

U.S. Cl. 40—121 3 Claims



1. A greeting card having a height at least twice its width and comprising:

a. a single sheet of card stock folded along a vertical side thereof when the greeting of said card is oriented for reading and forming thereby a front panel and a back panel, said front panel having an aperture in the lower portion of the panel, the fold between said panels being perforated to permit ready manual separation of said panels, and said back panel being scored and adapted when separated from said front panel to being folded into an easel supporting and displaying a tablet, said easel being triangular in shape when viewed from the side and being formed by folding said back panel approximately in half along a horizontal line; and

b. a tablet mounted on said back panel for viewing through said aperture when said card is in the closed position and for display on said easel, said tablet comprising a detachable cover page with a display thereon and thereunder additional pages.

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4,024,657

## PROMOTIONAL DEVICE

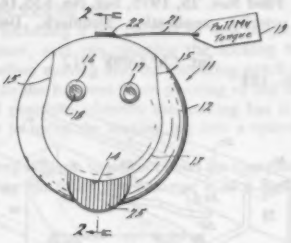
Freda M. Dutcher, Franklin, Mich., assignor to Michaleen Huff, Birmingham, Mich., a part interest

Filed Mar. 31, 1976, Ser. No. 672,385

Int. Cl.² G09F *19/00*

U.S. Cl. 40—126 R 6 Claims

1. A promotional device comprising a hollow rubber ball, a slit in said ball whereby squeezing of the ball will cause air to be expelled therethrough, a pair of simulated eyes attached to said ball above said slit, and a strip of flexible material carrying indicia forming a message, said strip being partially coiled up and the coiled portion inserted through said slit so as to be held within the ball but unattached thereto, the uncoiled portion of the strip protruding from the slit so as to simulate a tongue which may be grasped and pulled out and completely removed from said ball whereby said message may be read.



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4,024,658

## THREE DIMENSIONAL CHARACTER

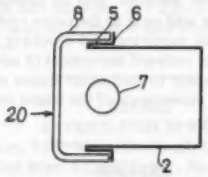
Eugen Hoerner, Neuer Weg 2, D-7101 Eberstadt (Baden-Wurttemberg), Germany

Filed Aug. 11, 1975, Ser. No. 603,257

Claims priority, application Germany, Aug. 12, 1974, 2438608

Int. Cl.² G09F *13/00*

U.S. Cl. 40—130 D 8 Claims



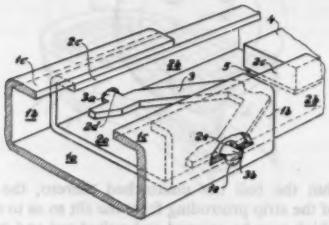
1. A three dimensional sign character comprising a box formed in the shape of the desired character, said box having a closed back and an open front, and a cover closing the open front of the box, said box having a back and a sheet metal side wall projecting forwardly from the back, a forward marginal portion of said side wall being folded back on itself to provide a marginal portion parallel to the side wall and an edge portion of said folded back marginal portion being bent at right angles to the side wall to provide an angular flange perpendicular to the side wall and set back from the open front of the box, said cover fitting over and closing the front of said box and having a face portion parallel to the back of the box and a peripheral rim portion which is perpendicular to said face portion and extends toward the back of the box, said rim portion of the cover laterally engaging said folded back marginal portion of the side wall of the box and seating on said angular flange, said flange performing the dual function of stiffening and reinforcing the open front of the box and of providing an abutment to position said cover relative to said box.

4,024,659

## ADJUSTABLE PICTURE FRAME

John Ingerdahl, Copenhagen, Denmark, assignor to I/S Biodan, Copenhagen, Denmark

Filed Nov. 25, 1975, Ser. No. 635,162
Claims priority, application Denmark, Dec. 4, 1974, 6300/74
Int. Cl.² G09F 1/12
U.S. Cl. 40—155 2 Claims



1. An adjustable picture frame comprising a plurality of inner and outer frame members which are telescopically displaceable with respect to each other, each frame member having a front wall, two opposed sidewalls and a back wall, said picture frame further having an arresting stud with rounded cam surfaces mounted within each inner frame member so as to project through an opening formed in one side wall thereof, a spring member urging said arresting stud to bear against the adjacent side wall of the associated outer frame member, and at least two longitudinally spaced openings formed in said adjacent side wall for receiving said arresting stud to thereby releasably hold the inner and outer frame members in a predetermined relative position;

a blocking stud mounted within each inner frame member so as to project through an opening formed in the side wall thereof opposite to said first side wall, said blocking stud having a rounded cam surface facing the outer end of said inner frame member, and a blocking surface extending substantially perpendicular to the longitudinal direction of the frame members, and located oppositely to said rounded cam surface, a spring means urging said blocking stud to bear against said adjacent side wall of the associated outer frame member, and an opening formed in said adjacent side wall near to the outer end of said outer frame member for receiving said blocking stud, thereby preventing further outward movement of said inner frame member with respect to said outer frame member while allowing relative movements of the frame members in the opposite direction.

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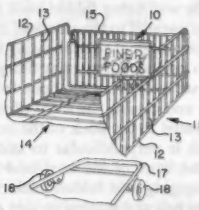
4,024,660

## ADVERTISING POCKET FOR SHOPPING CARTS

Irving A. Goto, 6220 W. Newport, Chicago, Ill. 60634

Filed Apr. 5, 1976, Ser. No. 673,796
Int. Cl.² G09F 1/10
U.S. Cl. 40—308 4 Claims




1. An advertising pocket for attachment to a shopping cart of the type having horizontally and vertically disposed rods defining a meshwork therefor, said pocket adapted for attachment about a portion of said meshwork in a manner permitting direct viewing by a user of a shopping cart of printed matter insertable into said pocket, said pocket comprising

a continuous back of generally rectangular configuration with a horizontal width, a vertical height; and horizontal and vertical edges associated therewith;

a transparent window of approximately the same horizontal width as said back, but of less vertical height then said back, said window aligned in parallel planar relationship with said back such that said window spans most of the area of said back except along one horizontal edge thereof;

a lip of approximately the same horizontal width as said back and of sufficient vertical height to span the area of said back not spanned by said window and to overlap a small portion of said window;

said back, window and lip being sealed around the edges of the back thereby defining an interior pocket area between said back and said window and said lip,

said window and said lip being of said flexible sheet material such that an edge of the lip overlapping an edge of said window are separable from each other for inserting printed matter in said pocket area or removing the same therefrom;

said lip overlapping said window thereby further preventing precipitation from entering said interior pocket area; and

attachment means affixed to the back of said pocket adapted to secure said pocket to the meshwork of said shopping cart; said attachment means being of a type which keeps said pocket in a generally planar orientation when attached to said shopping cart,

said attachment means comprises a pair of straps fabricated from plastic sheet stock and fastened at one end thereof at spaced positions along an edge of said back; a pair of first fasteners secured to said back along an opposite edge; and a pair of second fasteners attached to other ends of said straps, said pair of second fasteners adapted for snapping and cooperating engagement with said pair of first fasteners, said pair of first fasteners positioned along said opposite edge such that said pairs of straps are disposed along said back in a parallel spacedapart relationship when said first fasteners and said second fasteners are engaged.

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4,024,661

## SELF-STANDING OR PHONE MOUNTED CALENDAR

Keiji Kitamura, No. 6-60-407, 1 chome, Nishimiyahara, Yodogawa, Osaka, Japan (532), and Yasuko Furutuki, No. 1156, 2-chome, Venoshiba-Mukaigaoka, Sakai, (Osaka), Japan (593)

Filed Mar. 31, 1976, Ser. No. 672,549
Int. Cl.² G09F 3/00, 1/00; G09D 3/04
U.S. Cl. 40—337 6 Claims

1. A calendar device which is capable for use alternatively as a calendar which may stand on a flat surface and as a calendar which can be associated with a dial of a telephone, the device comprising a sheet having a substantially disc-shaped calendar part including means for fixing said calendar part on the central portion of a dial of a telephone and a

peripheral part, which is positioned radially outward from said calendar part; at least two cut lines nearly surrounding said calendar part and separating same from said peripheral part; at least two connecting points free of cut lines which connect said peripheral part to said calendar part, the upper portion of said peripheral part above said connecting points being bendable backward to form a supporting leg for standing the device on a flat surface; and an aperture in said calendar part through which a telephone number may be viewed when said calendar part is removed from the peripheral part and is in place centrally on a dial of a telephone, said calendar part having calendar numerals and letters thereon.

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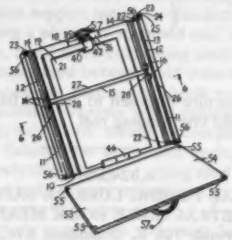
4,024,662

## COPYHOLDER AND LINE FOLLOWER

Lester S. Krulwich, 241 Central Park West, New York, N.Y. 10024

Filed Dec. 8, 1975, Ser. No. 638,826
Int. Cl.² B41J *11/14*
U.S. Cl. 40—352 4 Claims



1. An apparatus for holding copy and following lines comprising a backing on which elongated side extensions are laterally mounted, said side extensions having walls toward the inside at right angles to the backing, the walls of the side extensions having facings of magnetically attractable material extending angulary outward at the bottom over said backing, a rod with magnetic end members sufficiently long and horizontally positioned so that its said end members adhere magnetically to said facings and to their angular extensions, said rod capable of being manually moved to follow lines on the copy and an adjustable easel on which the backing rests.

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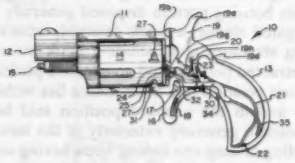
4,024,663

## CYLINDER LOCK FOR REVOLVERS

Wayne B. Baker, P.O. Box 188, Freedom, Idaho 83120

Filed Aug. 18, 1975, Ser. No. 605,669
Int. Cl.² F41C *1/00*
U.S. Cl. 42—67 5 Claims



1. A cylinder lock for revolvers having a frame including a handle and a barrel, a rotatable cylinder pivotally mounted in the frame, said cylinder having spaced notches formed thereabout and a spring biased hammer pivotally mounted to the frame, and means carried by the hammer and the cylinder, whereby the cylinder is partially rotated each time the hammer is cocked, said cylinder lock comprising

a locking bar;

means for pivotally mounting the locking bar to the frame;

a locking lug carried by said locking bar and adapted to extend into the notches of the cylinder;

means biasing the locking bar such that the locking lug is biased into said notches; a camming notch carried by one face of the locking bar;

pin means including a pin carried by and projecting from the hammer, said pin pivoting the locking bar downwardly before moving into the camming notch and being forced into the hammer upon pivoting of the hammer to a cocked position, whereby the locking bar is pivotable upwardly to move the locking lug into a cylinder notch; and

means biasing said pin to project from the hammer and over the locking bar when the hammer is in a forward firing position.

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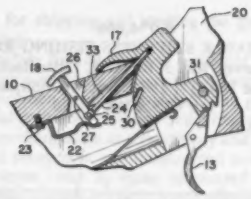
4,024,664

## SAFETY FOR RIFLE

Frank Murabito, 64-24 80th Ave., Glendale, N.Y. 11227

Filed Oct. 22, 1975, Ser. No. 624,794
Int. Cl.² F41C *17/04*
U.S. Cl. 42—70 F 6 Claims



1. In a rifle having a receiver portion for pivotably mounting a hammer which engages a trigger the improvement comprising a safety which engages said hammer, said safety including at least one bore formed in the rear surface of the hammer, lever means engaging said bore in at least one pivoted position of said hammer, said lever means additionally comprising a lever pivotably mounted adjacent to said hammer, a rod connected adjacent to the end of said lever for movement toward and away from said trigger, said rod engaging said at least one bore formed in said hammer, and a spring engaging said lever means urging said lever means into engagement with said at least one bore.

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4,024,665

## DIVER'S FISH SPEAR

Philip W. Payne, 1375 Miguelito Road, Lompoc, Calif. 93436

Filed Mar. 17, 1976, Ser. No. 667,844
Int. Cl.² A01K *81/00*
U.S. Cl. 43—6 2 Claims

1. A diver's fish spear including, in combination:

a. a shaft;

b. first and second scissor blades pivoted to one end of said shaft for rotation about axes passing through spaced points on either side of the longitudinal axis of the shaft, each of said blades having a smooth convex back edge and a barbed front edge including a series of barbs directed outwardly and rearwardly and terminating in sharp points such that when in closed position, the blades overlap with the back edges defining a spear outline terminating in an end point, and the barbed front edge of each blade terminating short of the back edge of the other so that the points are eclipsed thereby, pivoting of the blades past each other towards an open position respectively exposing said barbed front edges so that full opening of the blades after spearing of a fish is facilitated by attempts of the fish to eject the spear; and,

c. retracting means connected to said blades and extending within said hollow portion of said spear and thence out of

a side of the spear for manual operation by the same one hand of a diver holding the spear to retract said blades to their closed position.

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**4,024,666**

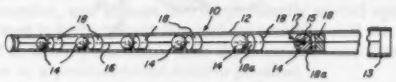
**VARIABLE STIFFNESS FISHING ROD**

**Stephen Dee Carver, Rte. 5, Box 561, Little Rock, Ark. 72212**

**Filed Feb. 17, 1976, Ser. No. 658,467**

**Int. Cl.² A01K** *87/00*

**U.S. Cl. 43—18 R** **8 Claims**



1. A variable stiffness fishing rod comprising:

an elongate, tubular rod portion of predetermined length;

a handle portion communicating with said tubular rod portion;

a plurality of stationary, force receivers disposed interiorly of said rod portion at spaced apart locations therein for selectively distributing force along the length of said rod portion to tension same;

a plurality of spaced apart, moveable force transmitters disposed interiorly of said rod portion, each one of said force transmitters positioned adjacent a corresponding one of said receivers; and

tension means disposed interiorly of said rod portion for moving said transmitters into abutment with said receivers thereby effecting stiffening of said fishing rod, said tension means comprising elongated cable means disposed concentrically within said rod portion and passing through said receivers and said transmitters, said cable means being attached to each one of said transmitters to prevent axial displacement therebetween.

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**4,024,667**

**FISHING REEL AND SUPPORT FOR ARCHERY BOWS**

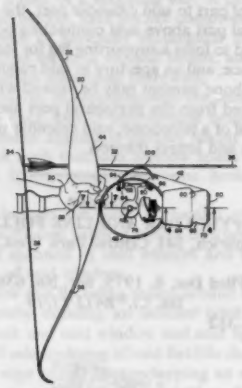
**Gary R. Wegener, 4618 W. Fairmount, Phoenix, Ariz. 85031**

**Filed July 22, 1976, Ser. No. 707,673**

**Int. Cl.² A01K** *91/02*; **F41B** *5/00*

**U.S. Cl. 43—19** **8 Claims**

1. An archery bow fishing reel and mount comprising: a frame adapted to be secured to the forward portion of an archery bow; first means for fixing said frame on said forward portion of an archery bow; said frame comprising a generally loop shaped structure having a rearward portion at which said means supports the same on said bow; a reel mount disposed in said generally loop shaped structure and adapted to support a line winding reel therein; said frame having a forward portion provided with second loop shaped strucutre; said second



loop shaped structure disposed to receive fishing line therethrough from said line winding reel.

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**4,024,668**

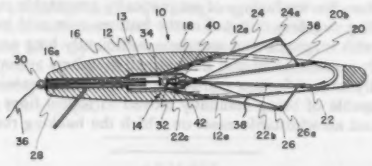
**ARTIFICIAL FISHING LURE OR BAIT HAVING RETRACTABLE HOOK MEANS**

**John C. McDiarmid, 706 E. Donaldson Ave., and Darrell F. Chapman, 730 Green St., both of Raeford, N.C. 28376**

**Filed Aug. 13, 1975, Ser. No. 604,426**

**Int. Cl.² A01K** *85/00*

**U.S. Cl. 43—35** **10 Claims**



1. A fishing lure and hook assembly comprising: an artificial lure having a body with an outer surface; a self-contained open central housing structure adapted to be disposed and contained interiorly of the body of said artificial lure and completely independent thereof, said housing structure being generally elongated and including a front elongated sleeve joining a main housing portion disposed generally rearwardly of said elongated sleeve; a hook assembly attached to said main housing structure and including hook means movable between a retracted position and an exposed position wherein in the retracted position said hook means lies within the body of said lure and in the exposed position said hook means assumes a position generally exteriorly of the lure, said hook means including at least one fishing hook having an end pivotably mounted to said main housing, an intermediate shank portion, and a hook end; said hook assembly further including at least one relatively thin elongated spring steel biasing member fixed at one end to said main housing structure and extending therefrom where an opposite hook actuating end of said spring steel member is operatively engageable with said shank portion of said hook means for normally biasing said hook to said retracted position; and actuating means operatively interconnected between said spring steel biasing member and a fishing line extending from said artificial lure for

actuating said hook means and moving said hook means from said normally retracted position to said exposed position where the hook means projects outwardly from the body of said fishing lure, said actuating means including connecting means extending through the fishing lure body, along and adjacent said sleeve of said housing structure and wherein an end portion of said connecting means is connected directly to said spring steel member for actuating the same in response to the exertion of a predetermined amount of tension on said fishing line relative to said lure, whereby said hook is moved to the exposed position in response to a fish grasping the lure and the exertion of a particular amount of tension on the fishing line.

7. A self-contained fishing hook assembly and actuating mechanism adapted to be disposed interiorly within a fishing lure body, said self-contained fishing hook assembly and actuating mechanism comprising: a main support means adapted to be disposed interiorly within a fishing lure body, said main support means including a generally elongated housing structure adapted to be disposed longitudinally within the fishing lure body; hook means pivotably mounted about a transverse axis about said main support means and including at least one fishing hook having a pivotably mounted end, and intermediate shank portion, and a hook end; spring steel biasing means operatively interconnected between said main support means and said hook means for biasing said hook means to a normally retracted position wherein when disposed within said fishing lure body, said hook means is completely disposed interiorly of the fishing lure body, said spring steel means including a relatively thin elongated spring steel member fixed at one end to said main support means and extending therefrom where an opposite hook actuating end of said spring steel member is operatively engageable with said shank portion of said hook means for imparting movement thereto; and actuating means operatively connected to said spring steel biasing means for actuating said hook means and moving said hook means from said normally retracted position to an extended position where the hook end of said hook means projects outwardly from the body of said fishing lure, said actuating means including a flexible line extending through the fishing lure body, along and adjacent said housing structure of said main support means and wherein an end portion of said actuating means is connected directly to said spring steel means for actuating the same in response to a certain tension placed on said fishing lure body once the fishing lure body has been attacked by a fish.

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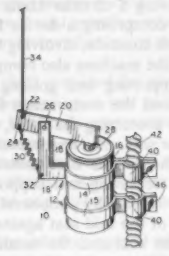
**4,024,669**

## BUBBLE CHUM

James W. Fotis, Forest Hills, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Mar. 18, 1976, Ser. No. 667,899
Int. Cl.² A01K 97/02
U.S. Cl. 43—44.99 4 Claims



1. An apparatus for attracting fish by the dispensation of bait, or the like from an aerosol container comprising:

a. a housing for an aerosol container;

b. means for the activation of said aerosol container affixed therein; and

c. means for the submersion of said aerosol container affixed to said housing.

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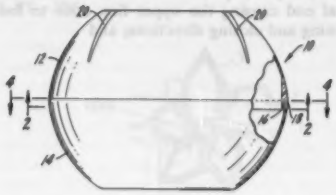
**4,024,670**

## SHIPPING AND GROWING APPARATUS FOR SEEDS

Peter W. Stanley, 167 Cranston Court, Glen Ellyn, Ill. 60137

Filed Oct. 20, 1975, Ser. No. 624,265
Int. Cl.² A01C 11/00
U.S. Cl. 47—73 9 Claims



1. A device for shipping and starting the growth of plant seeds, comprising:

a. complementary first and second container portions, said portions being mutually engageable to form a receptacle for transportation of plant seeds and plant growth matter, each of said container portions being functionally identical and interchangeable as a repository and a cover member of said receptacle and constructed and arranged to retrain at least twice as many masses of plant growth matter in said repository during utilization of the device as a transportation receptacle than are supported in each of said container portions during utilization of the device as a growing container; and

b. first and second upright permanent support means in each of said container portions for holding at least one mass of plant growth matter above the base of each of said container portions during utilization of the device as a growing container, said support means in said container portions cooperating with each other during utilization of the device as a transportation receptacle such that said support means in said repository defines a compartment providing lateral support for a plurality of said masses of plant growth matter and said second support means in said cover member retains said masses of plant growth matter in said compartment.

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**4,024,671**

## MUTUALLY COUNTERBALANCING UPPER AND LOWER FLAP DOORS OF WIDE DOORWAY

Masao Isobe, Takasaki, Japan, assignor to Daiwa Jidosha Kogyo Kabushiki Kaisha, Takasaki, Japan

Filed Sept. 23, 1975, Ser. No. 615,855
Claims priority, application Japan, Feb. 1, 1975, 50-71791[U]
Int. Cl.² E05C 7/06
U.S. Cl. 49—104 5 Claims

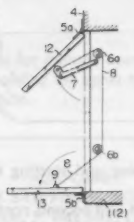
1. An improved hollow structure comprising: a vertical wall part formed with an opening; a doorway frame bordering the opening and including a lower frame member, two vertical posts rising from opposite ends of the lower frame member, and an upper frame member disposed between the tops of the two posts; upper and lower flap doors respectively connected by upper and lower hinges to the upper and lower frame members and adapted to swing about the hinges to close and open upper and lower parts of the opening, the upper and lower flap doors each having inner and outer surfaces and being openable to respective fully-opened positions at which the flap doors are clear of possible paths of objects passing through the opening; and a coupling device for intercoupling

the upper and lower flap doors in a manner synchronize the movements thereof between fully-closed positions thereof and said fully-opened positions and to cause the force of gravity acting on the upper and lower flap doors to substantially counterbalance each other, the improvement residing in that said coupling device comprises:

a. upper and lower guide wheels rotatably supported on said one of the posts;

b. a lever pivotally secured at a proximal end thereof to the inner surface of the upper flap door;

c. guide means for guiding and permitting the other distal end of the lever to move only in a substantially vertical and linear path, upward and downward movements of the distal end causing the upper flap door to move in the opening and closing directions; and



d. an elongate flexible member anchored at one end thereof to the lever near the distal end thereof, passed over the upper guide wheel in an inverted U-shaped fashion and then over the lower guide wheel, and anchored at the other end thereof to the inner surface of the lower flap door, in a manner such that opening movement of the lower flap door causes the flexible member to be pulled at said other end thereof and to pull up said distal end of the lever thereby to open the upper flap door, and closing movement of the lower flap door permits the flexible member to move in reverse to permit the distal end of the lever to descend thereby to permit the upper flap door to move in the closing direction.

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**4,024,672**

## APPARATUS FOR THE MICRO-FINISH OF CYLINDRICAL OR CONICAL SURFACES

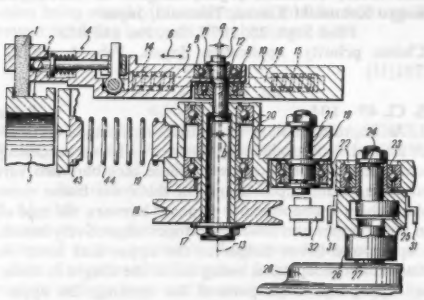
**Karl Wieck, Stuttgart, Germany, assignor to Supfina Maschinenfabrik Hentzen KG, Remscheid, Germany**

**Filed Mar. 17, 1975, Ser. No. 558,956**

**Claims priority, application Germany, Mar. 18, 1974, 2413000**

**Int. Cl.² B24B *19/06***

**U.S. Cl. 51—57** **5 Claims**



1. In an apparatus for micro-finish machining of cylindrical or conical surfaces, of total length (D), on rotating workpieces, and in particular for the raceways of cylindrical or tapered roller bearings including a honing tool, the improvement comprising:

a. a first slide means engaging the honing tool;

b. means mounting the first slide means relative to the workpiece so that it and the honing tool will experience a first oscillation relative to the surface to be machined, whereby the stroke of said first oscillation is determined such that it is short as compared with the total length of the surface to be machined;

c. second slide means to which the means mounting the first slide means is mounted; and

d. drive means connected to the second slide means for driving the two slide means, the means mounting the first slide means and the honing tool so that the first slide means and the honing tool experience a second oscillation relative to the surface to be machined, whereby the stroke of said second oscillation is determined such that the path of the tool as determined by said second oscillation, essentially extends over the total length to be machined; wherein the drive means comprises:

i. a drive motor;

ii. a rotating part connected to the drive motor and to the second slide means, said rotating part having tab means extending outwardly therefrom;

iii. sensing means provided along the path of motion of the tab means; and

iv. arresting means connected to the sensing means and to the drive motor, said arresting means serving to arrest the drive motor for an adjustable length of time as a function of the time lapse between sensed positions of the tab means by the sensing means.

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**4,024,673**

## MACHINES WITH A CIRCULAR BLANK-HOLDER SPINDLE

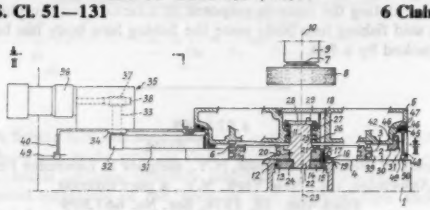
**Robert G. Collignon, Bois d'Arcy, France, assignor to CNMP Berthiez, France**

**Filed June 21, 1976, Ser. No. 697,966**

**Claims priority, application France, June 25, 1975, 75.19964**

**Int. Cl.² B24B *7/04*, *41/06***

**U.S. Cl. 51—131** **6 Claims**



1. A machine having a circular blank-holder table and a tool-holder spindle comprising a device for making their respective rotation axes coincide, involving the application of an eccentric, whereby the machine also comprises a base plate, a seat, means for supporting and guiding in rotation placed between the table and the seat, means for rotating the said table and means for protecting the latter, wherein the contact surfaces between the seat and a base member forming the base plate are planar, wherein the base member defines a shouldered bore for the centering and supporting of a retaining plate connected to the seat by peripheral locking means permitting the locking of the said seat against the base member, whilst permitting the seat and the retaining plate to rotate freely when the locking members are unlocked and wherein the seat is integral with a pivot in two parts, whereof one is slidingly mounted in the said retaining plate parallel to its rotation axis, whilst the other is off-centred relative to this axis in order to support at least one central bearing for the rotary

guidance of the table, the regulation of the rotation axis of the latter being obtained by simply pivoting the seat.

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4,024,674

## GUARD DEVICE FOR A GRINDING WHEEL IN A GRINDING MACHINE

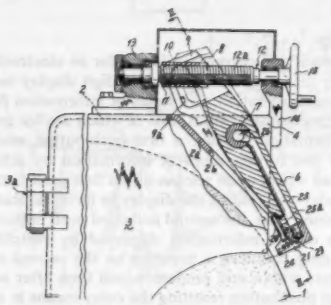
Yoshinobu Suzuki, Aichi, Japan, assignor to Toyoda Koki Kabushiki Kaisha, Kariya, Japan

Filed Dec. 31, 1975, Ser. No. 645,635

Claims priority, application Japan, Jan. 22, 1975, 50-11023[U]

Int. Cl.² B24B 55/02, 55/04

U.S. Cl. 51—268 6 Claims



1. A guard device for a grinding wheel in a grinding machine comprising:

a guard body for covering said grinding wheel rotatably mounted upon a wheel carrier and having a lateral opening defined therein;

a lateral guard plate mounted upon said guard body for covering said lateral opening;

a front cover member provided for covering the upper-front portion of said grinding wheel and pivotably mounted upon said guard body, with the lowermost end thereof movable toward and away from the outer periphery of said grinding wheel;

coolant discharging means provided for discharging a coolant fluid toward said grinding wheel and mounted upon said front cover member so as to be moved integrally therewith;

a hollow pivot shaft provided for pivotably supporting said front cover member upon said guard body and having an internal bore fluidically communicated with said coolant discharging means;

a screw shaft rotatably supported upon said guard body, with the axis thereof extending in a transverse direction with respect to said pivot shaft of said front cover member; and

a nut member threadedly engaged with the screw shaft and adapted to pivotably move said front cover member through the movement thereof caused by the rotation of said screw shaft so as to adjust the position of said coolant discharging means and said front cover member with respect to said grinding wheel.

4,024,675

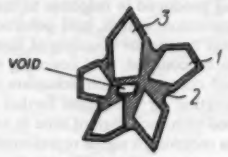
## METHOD OF PRODUCING AGGREGATED ABRASIVE GRAINS

Jury Vladimirovich Naidich, prospekt Vernadskogo, 85, kv. 48; Irina Alexandrovna Lavrinenko, ulitsa Krasnoarmeiskaya, 122, kv. 51; Vladimir Afanasievich Kondratsky, ulitsa Semashko, 8, kv. 16; Jury Nikolaevich Semenov, ulitsa Zhelyabova, 10, kv. 9; Boris Mikhailovich Emelyanov, ulitsa Kirova, 28/2, kv. 91, and Leonid Pinkhusovich Kogosov, ulitsa Krasnopolskaya, 16, kv. 26, all of Kiev, U.S.S.R.

Continuation of Ser. No. 469,748, May 14, 1974, abandoned. This application Dec. 8, 1975, Ser. No. 638,690

Int. Cl.² B24D 3/06, 3/10

U.S. Cl. 51—296 1 Claim




1. In a method of producing aggregated abrasive grains in which a mixture of abrasive powders and metal powders is sintered to produce a cake which is crushed to form the abrasive grains, the improvement comprising the steps of: adding an adhesion-active agent to the mixture, the agent being selected from the group consisting of titanium, zirconium, chromium, vanadium and silicon; maintaining the mixture in a loose bulk state during the sintering step; and effecting the sintering at a temperature of between 800 and 1200° C, sufficient to melt the metal powders, so that the produced cake is porous; wherein the abrasive powders are selected from the group consisting of diamond, cubic boron-nitride, boron-carbide, silicon-carbide and aluminum-oxide powders; the metal powders being selected from the group consisting of copper, tin, nickel, cobalt, iron, silver, and alloys thereof; the ratio of the abrasive powders to the metal powders being between 4:1 and 1:1.5 by weight; and the adhesion-active agent being added to and present in an amount between 5 and 10% by weight of the metal powders.

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4,024,676

## ELECTRONIC TIMEPIECE

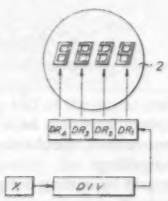
Katsumi Yamamura, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Continuation-in-part of Ser. No. 399,039, Sept. 24, 1973, abandoned, which is a continuation-in-part of Ser. No. 178,962, Sept. 9, 1971, abandoned. This application June 13, 1975, Ser. No. 586,675

Claims priority, application Japan, Sept. 12, 1970, 45-79659

Int. Cl.² G04C 3/00; G04B 19/30, 27/00

U.S. Cl. 58—23 A 7 Claims




1. An electronic timepiece comprising quartz crystal oscillator means for generating a time standard signal; divider circuit means for producing a plurality of timekeeping signals each corresponding to a digit of time to be displayed in response to

said time standard applied thereto; liquid crystal display means for digitally displaying a plurality of digits of time in response to said timekeeping signals coupled thereto; driving circuit means intermediate said display means and said divider circuit means for coupling said timekeeping signals to said display means; and means for selectively correcting each of said plurality of digits of displayed time of said display means, said correction means being coupled to said divider means and including a manually operable selection switch, a manually operable correction switch, and selection circuit means coupled to said correction and selection switches for the selection of the digit of time to be corrected in response to the actuation of said selection switch and the transmission of a correction signal to said divider means for correcting the timekeeping signal associated with the selected digit of time, said correction signal being produced in response to the selective actuation of said correction switch, said selection circuit means including counter means for counting at least up to the number of digits to be counted, said counting means advancing one unit of said count for each actuation of said selection switch, said selection circuit means further including a gate means associated with each digit of time to be corrected, each said gate means receiving a signal representative of one of the counts of said counter means and having an output coupled to said divider means for correcting the count of the timekeeping signal associated with the associated digit of time to be corrected, said divider means including a plurality of series-connected divider stages, one of said divider stages producing each of said timekeeping signals and having an input and an output in said series connection, each said gate means including a first gate having as its input a signal representative of the count of said counter means and a signal representative of the selective energization of the correction switch, and a second gate having as its input the output of said first gate and the input of the divider stage immediately prior to the divider stage associated with the digit of time to be corrected in said series connection, the output of said second gate being applied as the input to said associated divider stage the count of which is to be corrected.

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**4,024,677**

## METHOD OF MANUFACTURING AN ELECTRIC TIMEPIECE AND ELECTRIC TIMEPIECE OBTAINED BY CARRYING OUT THIS METHOD

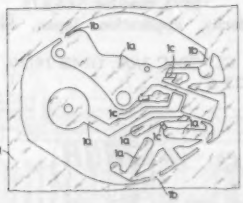
René Meister, Neuchatel, and Alain Tyrode, Saint-Aubin, both of Switzerland, assignors to Ebauches S.A., Switzerland

Filed May 7, 1975, Ser. No. 575,368

Claims priority, application Switzerland, May 24, 1974, 7115/74

Int. Cl.² B23P *13/00*; G04C *3/00*; G04B *29/02*, *27/00*

U.S. Cl. 58—23 R 5 Claims



1. A method of manufacturing an electronic timepiece having a frame of movement, mechanical elements and an electronic circuit comprising:

forming a metallic grid by cutting out portions of said grid from a metallic sheet;

forming at least one connection element for said electronic circuit from a first portion of said grid;

forming at least one mechanical element for said timepiece from a second portion of said grid; and

forming a support for said electronic circuit by overmoulding plastic material on said metallic grid portions, said support including at leat one open portion.

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**4,024,678**

## CONTROL AND CORRECTION CIRCUIT FOR AN ELECTRONIC WATCH

Hubert Portmann, Colombier; Willy Droz, Hauterive, and Jean-Luc Beguin, Neuchatel, all of Switzerland, assignors to Ebauches S.A., Neuchatel, Switzerland

Filed Dec. 10, 1975, Ser. No. 639,416

Claims priority, application Switzerland, Jan. 10, 1975, 278/75

Int. Cl.² G04C *3/00*; G04B *27/00*

U.S. Cl. 58—23 R 3 Claims

1. A control and correction device for an electronic watch comprising time counters and a four digit display indicating, during normal operation, two items of information from said counters, three push-buttons, two of which are for correction of the information display, a first push-button enables the display of two further items of information by activating a delay means which upon release of the first push-button initiates the delay and returns the display to its initial state after a predetermined time, the second and third push buttons permit correction of the information displayed by switching their corresponding counters, a pressure on the second and third push-buttons within said predetermined time after activation of said first pushbutton resetting the delay means in a manner to permit a modification of the information display without the device returning to the initial state during the correction.

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**4,024,679**

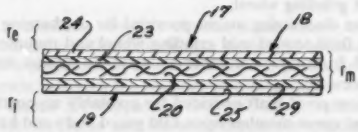
## AIR SUPPORTED STRUCTURE MEMBRANE CONFIGURATION

Lloyd H. Rain, and Terence W. McLorg, both of Lexington, Ky., assignors to Irvin Industries, Inc., Greenwich, Conn.

Filed Jan. 5, 1976, Ser. No. 646,736

Int. Cl.² E04B *1/345*

U.S. Cl. 52—2 11 Claims




1. An air supported structure including a wall portion having a membrane configuration provided with an outer side and inner side and comprising structural substrate having a long wave opacity coating on one side thereof, a short wave opacity coating being applied over said long wave opacity coating; and a coating having long wave opacity and reflectivity being applied on the other side of said structural substrate, said long wave opacity coating side of said structural substrate forming the outer side of said membrane configuration and said coat-

ing having long wave opacity and reflectivity coating side of said structural substrate forming the inner side of said membrane configuration; said long wave opacity coating comprising black vinyl, said short wave opacity coating comprising white polyvinyl flouride, and said coating having long wave opacity and reflectivity comprising an aluminized coating; said structural substrate comprising a woven nylon filament having a coating bond applied to the side thereof opposite said long wave opacity coating side thereof, said coating having long wave opacity and reflectivity being applied over said coating bond; said long wave opacity coating comprising black vinyl, said short wave opacity coating comprising white polyvinyl fluoride, said coating bond comprising white vinyl, and said coating having long wave opacity and reflectivity comprising an aluminized coating.

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**4,024,680**

## PREFABRICATED STRUCTURE FOR ERECTING A BUILDING

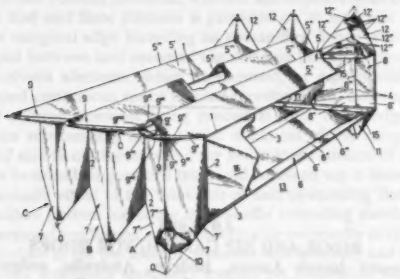
**Pierre J. Blyweert, Brussels, Belgium, assignor to Lera Holding S.A., Luxembourg**

**Filed May 24, 1976, Ser. No. 689,631**

**Claims priority, application Luxembourg, May 27, 1975, 72586**

**Int. Cl.² E04B 7/12, 1/344**

**U.S. Cl. 52—18** **14 Claims**



1. Prefabricated structure for erecting a building, that comprises bays hinged together which can take a position with a reduced volume and a position of extension, in which each bay comprises in the structure erecting condition and from the geometrical point-of-view, two pairs of dihedrons facing one another by pairs and comprising respectively the roof, the underflooring and the frontages of the bay, each dihedron comprising two sides hinged together along the dihedron intersection line and the junction areas between the dihedrons are each comprised of a truncated polyhedron comprising four side surfaces hinged together along their converging edges, said edges converging towards an apex located outside the imaginary right angle between the intersection lines of two dihedrons, two of those edges opposite the converging edges of the polyhedron being hingedly joined to one of the dihedrons, the structure further comprising means for stabilizing the dihedron angles in the bay extension condition, and the succeeding bays being hingedly connected together along the adjacent circumferential edges thereof.

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**4,024,681**

## FLASHING SYSTEM

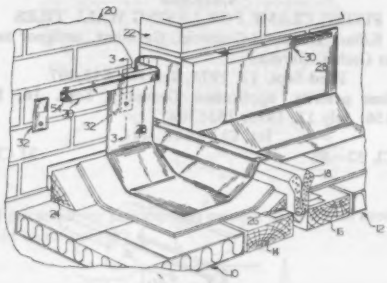
**Robert J. Bynoe, Chagrin Falls, Ohio, assignor to Tremco Incorporated, Cuyahoga County, Ohio**

**Filed June 17, 1976, Ser. No. 697,229**

**Int. Cl.³ E04D 1/36; E04B 7/00**

**U.S. Cl. 52—60** **8 Claims**

1. Apparatus comprising a longitudinally extending bracket member adapted to be secured to at least one of a plurality of adjoining structural surfaces which are exposed to ambient conditions, said bracket including means forming a longitudinal opening, a sheet of flexible material extending partially through said longitudinal opening, said sheet of flexible material being supported by said bracket member with a portion thereof disposed to cover a predetermined portion of said adjoining structural surfaces, a stiffening member comprising a longitudinally extending planar member having a portion thereof fixedly secured to said sheet of flexible material, said bracket member defining longitudinally extending track



means for slidably engaging a portion of said stiffening member for supporting and for guiding said stiffening member and said sheet of flexible material for sliding movement in generally longitudinal directions relative to said bracket member, said bracket member further defining means for resisting dislodgement of said stiffening member from said bracket by movement of said stiffening member through said longitudinal opening.

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**4,024,682**

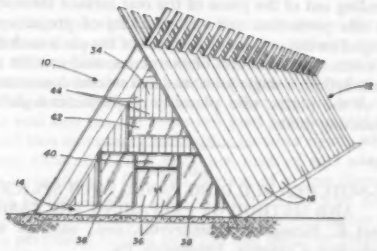
## A-FRAME BUILDING

**Billy H. Jamison, 1305 Blanton Drive, Sherman, Tex. 75090**

**Filed June 16, 1976, Ser. No. 696,694**

**Int. Cl.² E04B 1/48**

**U.S. Cl. 52—90** **10 Claims**



1. An A-frame building comprising:

a plurality of angularly upwardly disposed beams defining a roof/wall structure;

each beam having half of the upper end thereof removed to define a notch and an upper end portion of the beam extending adjacent to the notch;

the beams comprising the roof/wall structure being arranged in opposed pairs with the upper end portion of each beam being received in the notch of the opposite beam so that the beams are interlocking and self-supporting;

the notch of each beam being defined by a surface extending parallel to and positioned in engagement with the under surface of the opposite beam;

joint means interconnecting adjacent beams to define a continuous roof/wall structure;

a floor structure underlying the roof/wall structure and including at least cast members comprising end portions of the floor structure; and

the lower ends of the beams defining the roof/wall structure being received in the cast structure of the end portions of the floor structure and thereby being secured in place.

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**4,024,683**

**FIXING CLAMP FOR LAYING WALL TILES**

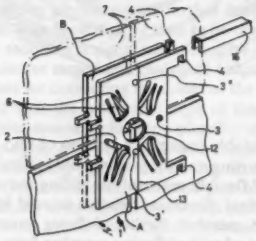
**Heinz Kilian, Huttental-Geisweid, Germany, assignor to Irie Deuz GmbH, Germany**

**Filed Sept. 12, 1975, Ser. No. 612,807**

**Claims priority, application Germany, Sept. 16, 1974, 2444156; July 12, 1975, 2531304**

**Int. Cl.² E04B *1/41***

**U.S. Cl. 52—98** **31 Claims**



1. A fixing clamp for laying wall tiles, the fixing clamp comprising: a rear plate and a front plate, each plate having a front and rear surface, means for releasably connecting the front and rear plates to each other and for maintaining the plates at a predetermined distance from one another in a connected condition, said connecting means including at least one plug arranged on one of the plates and at least one socket arranged on the other of the plates for receiving said at least one plug, and wherein at least one of the plates is provided with at least one projection extending out of the plane of the plate on the front surface thereof and a plurality of projections extending out of the plane of the rear surface thereof, said at least one projection and said plurality of projections being arranged on the respective surfaces of the plate such that, in a first connected condition of the plates, said at least one projection defines a single joint, and in a second connected condition of the plates, said plurality of projections defines two intersecting joints.

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**4,024,684**

**PRE-NOTCHED BUILDING PANEL WITH SPLICE PLATE AND METHOD OF PREPARING THE SAME**

**Robert E. Holmgren, Connersville, Ind., assignor to H. H. Robertson Company, Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 149,245, June 2, 1971, abandoned. This application Sept. 20, 1973, Ser. No. 399,151**

**Int. Cl.² E02D *35/00***

**U.S. Cl. 52—127** **10 Claims**

1. An unsupported laminated building panel provided in a flat condition and comprising:

a metal facing sheet;

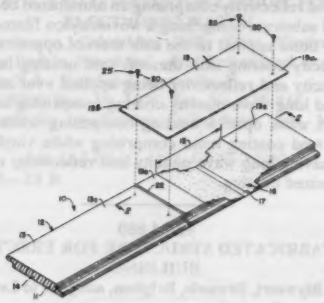
a liner sheet; and

a low strength, foamed plastic, insulating core disposed between said facing sheet and said liner sheet;

said panel presenting a gap in said liner sheet which divides said liner sheet into separate liner sheet segments, and which reduces the structural integrity of said panel in a direction transverse to said gap;

a relatively rigid, temporary splice plate spanning across and beyond said gap and having opposite plate ends overlying said separate liner sheet segments, said splice plate having an overall length which is less than the overall length of said building panel; and

securing elements distinct from said splice plate and disposed at locations remote from said gap, detachably



securing each of said opposite plate ends to said building panel, thereby to temporarily reinstate the structural integrity of said panel in said direction transverse to said gap and to maintain said panel in said flat condition during handling and shipment.

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**4,024,685**

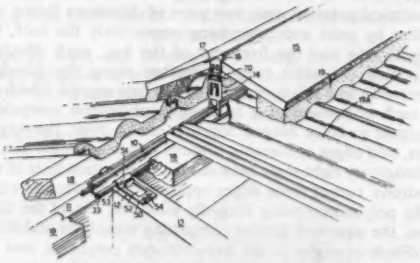
**RIDGE AND HIP CAPPING FOR ROOFS**

**Raymond Joseph Aarons, Jindalee, Australia, assignor to Monier Colourtile Pty. Ltd., Darra, Australia**

**Filed May 14, 1976, Ser. No. 686,552**

**Int. Cl.² L04B *7/06***

**U.S. Cl. 52—278** **7 Claims**



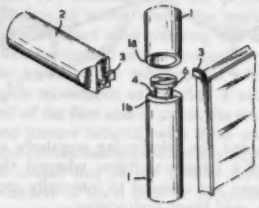
1. A ridge-cap or hip-cap assembly for a roof, comprising: a rail; oppositely extending top flanges on said rail; fixing means for mounting said rail longitudinally to a ridge- or hip-board; a series of end-to-end cap sections forming a continuous roof capping above said rail; a series of clips each slidably engaged on said rail and each passing up between adjacent cap sections; flanges on the upper end of each clip, bearing upon the upper surfaces of both said adjacent cap sections; and oppositely extending slots at the lower end of each clip slidably engaging said top flanges on said rail; said rail having a flanged base resting on said board, substantially cylindrical rolled outer edge on either side of said base and a central vertical web between said top flanges and said base.

4,024,686

## ASSEMBLY BUILDING HAVING FLOOR ELEMENTS SUPPORTED BETWEEN SUPERIMPOSED COLUMNS

Ronald Gronert, Willem de Rijkelaan 76, Hillegom, Netherlands

Filed Nov. 21, 1975, Ser. No. 634,230
Claims priority, application Netherlands, Dec. 13, 1974, 7416243
Int. Cl.² E04B 5/00
U.S. Cl. 52—282 3 Claims



1. In an assembly building including column elements which are capable of being superposed and have a recessed top for receiving a hollow bottom of a superposed subsequent column element, and a floor element which is clamped between said superposed column elements, wherein the improvement comprises that said floor element is provided on at least one end with a marginal edge including an upstanding flange which is clamped between said recessed top and said hollow bottom of said column elements, when superposed, in a substantially L-shaped continuous space located therebetween, said superposed column elements being spaced at their outer edges a distance substantially equal to the thickness of the marginal edge of said floor elements and the lower inner surface of said hollow bottom being spaced from said recessed top a distance substantially equal to the thickness of said upstanding flange, said hollow bottom including an inwardly extending shoulder, said recessed top having a non-deformable outwardly projecting shoulder at the top thereof, whereby said inwardly and said outwardly extending shoulders located on respective superposed column elements engage and the upstanding flange of the floor element is clamped under said outwardly projecting shoulder, and said marginal edge and said upstanding flange each being independently clamped within the vertical and horizontal portions of said L-shaped annular space respectively.

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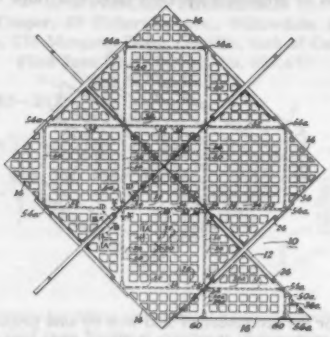
4,024,687

## ARCHITECTURAL SYSTEM HAVING POST-TENSIONED ELEMENTS

John Kozak, 323 Leax Lane, Turtle Creek, Pa. 15145

Filed June 26, 1975, Ser. No. 590,417
Int. Cl.² E04C 3/10, 3/26
U.S. Cl. 52—228 15 Claims

1. An architectural structure comprising a number of free-standing wall modules of cruciform configuration having arm portions extending therefrom and forming bearing wall sections each extending from a floor to a juxtaposed ceiling of said structure, an upper bearing surface adjacent the end of each of said arm portions, a square or rectangular supporting beam network disposed with each of its corner sections engaging one of said bearing surfaces, and a substantially self-supporting floor/ceiling module supported on said beam arrangement and substantially coinciding with a given floor area, said cruciform wall modules being oriented and spaced from one another to define said given floor area as extending therebetween and having its perimetric edges angularly displaced relative to otherwise corresponding perimetric edges of said beam network such that the total floor or ceiling area of said floor/ceiling module is substantially larger than a total corresponding area enclosed by said beam network and so that at least one corner portion of said floor/ceiling module is supported in cantilever fashion with respect to said wall modules and said beam network.



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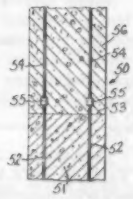
4,024,688

## CONCRETE REINFORCING BAR EXTENSION CONSTRUCTION AND METHOD

Anthony J. Calini, Rte. No. 1, Guilford, Conn. 06437

Continuation of Ser. No. 171,089, Aug. 12, 1971, abandoned.
This application Mar. 5, 1976, Ser. No. 664,107
Int. Cl.² E04B 1/16
U.S. Cl. 52—378 8 Claims



1. In combination with a concrete structure cast on site and having first and second contacting concrete sections poured on site at different times, a first rigid reinforcing bar extending in the structure from the first poured section to the other and a second rigid reinforcing bar in the other section and connected to said first bar, an improved joint between said first and second bars comprising an adaptor member rigidly joined to adjacent ends of each of said bars, each of said adaptor members comprising a first end portion of a first diameter connected to the adjacent ends of each of the bars and a second end portion of larger diameter and having a planar end surface, a peripheral surface between said different diameter portions defining a shoulder, a clamping member disposed about said adaptors and engaging said shoulders of said adaptors and rigidly holding said end surfaces in contact whereby the joint between said reinforcing rods reacts all compression and tension forces exerted on said rods.

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4,024,689

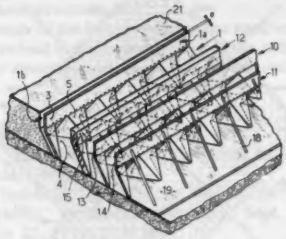
## SECTIONAL JOINT AND SLAB FROM CAST MATERIAL

Pierre Alexandre Georges Louis, 27 rue Robert de Flers, 75015 Paris, France

Filed Oct. 16, 1975, Ser. No. 623,065
Int. Cl.² E04B 1/62
U.S. Cl. 52—396 8 Claims

1. An improved sectional joint for obtaining slabs made from cast material comprising a web having two faces, each

face being provided with projecting and with recessed portions, wherein said web has a flat outer ridge devoid of any depression or projection on each face, said ridge being ex-



tended for the remainder of said web by said projecting and said recessed portions having arch-like walls adapted to bear upon the ground by a base-line having an undulating shape to ensure the holding of the web.

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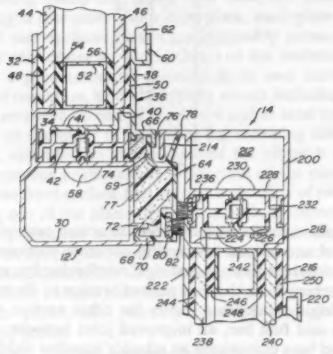
**4,024,690**

**WINDOW SASH AND FRAME WITH THERMAL BARRIER**

**David R. Collins, Washington Crossing, Pa., and Sheldon N. Katz, Cherry Hill, N.J., assignors to Replacement Products Industries Corporation, Cornwells Heights, Pa.**

**Filed Feb. 25, 1976, Ser. No. 661,199**
**Int. Cl.² E04B 1/62; E05C 3/02**
**U.S. Cl. 52—397** **18 Claims**



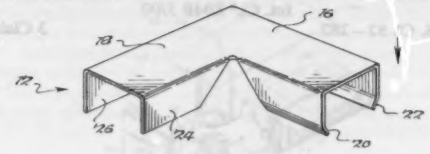
1. A window sash comprising a sash border having a pair of side members and a top member and a bottom member, four non-metallic corner members, each corner member being part of said border and innerconnecting one end of a side member with an end of one of said top and bottom members, said sash border supporting two panes of transparent material spaced apart by a dead air space, a thermal barrier strip between the periphery of each pane and a juxtaposed surface of said sash border, said sash border having oppositely disposed major faces, one of which is the indoor face and the other being an outdoor face, said sash border members are metal members on the outdoor face thereof and metal members on the indoor face thereof, the transverse dimension of said corner members being substantially equal to the distance between said major faces, and means including a preformed rigid non-metallic thermal barrier insulating said metal members on the outdoor face from corresponding metal members on the indoor face at spaced parallel zones across the width of juxtaposed portions of said metal members so that there is no direct heat conductive contact between said metal members of said outdoor and indoor faces of said border.

**4,024,691**

**CORNER KEY REINFORCEMENT BRACE**

**Barton G. Hansen, Cheektowaga; Charles P. Goetz, Kenmore, and John A. Gasper, Hamburg, all of N.Y., assignors to Roblin Industries, Inc., Buffalo, N.Y.**

**Filed June 6, 1975, Ser. No. 584,480**
**Int. Cl.² E04C 2/38**
**U.S. Cl. 52—656** **7 Claims**



1. A brace adapted for reinforcing angularly connected tubular portions of a structural frame wherein the tubular portions of the frame are adapted to internally receive portions of said brace, said brace comprising:

a pair of half-sections substantially identical to one another, each said half-section including first and second leg portions, said leg portions being rigidly connected together in an angular disposition with respect to one another and each of said leg portions further being generally U-shaped in transverse cross-section so as to include a pair of upstanding sidewalls and a bottom wall extending between said pair of sidewalls with said bottom walls being substantially co-planar with respect to one another, and

said half-sections being inverted and engaged with respect to one another so that said leg portions of one said half-section engage non-corresponding leg portions of the other said half-section wherein at least one sidewall of said first leg portion of each said half-section is bent inwardly of said first leg portion towards said opposite sidewall thereof so that both sidewalls of said first leg portion of each said half section are engaged in a resilient manner between said sidewalls of said second leg portion of said adjacent, inverted half-section engaged therewith.

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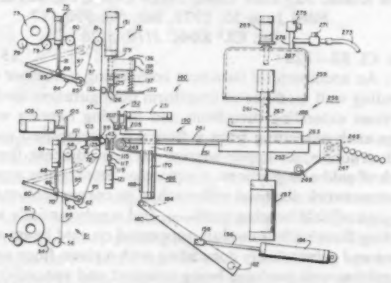
**4,024,692**

**APPARATUS AND METHOD OF PACKAGING LARGE ITEMS**

**William E. Young, Atlantic Highlands; Robert O. Wolfelsperger, Fairfield, and William R. Pasco, Cream Ridge, all of N.J., assignors to William E. Young, Atlantic Highlands, N.J.**

**Filed Feb. 18, 1976, Ser. No. 658,991**
**Int. Cl.² B65B 31/02, 9/02**
**U.S. Cl. 53—22 A** **17 Claims**



11. A method for packaging large products which may have irregular surfaces and voids, the method utilizing a film which has sealing capabilities, said method including the steps of: (a)

providing and delivering to a product enclosing station a tubular portion of film open at both ends; (b) placing a product to be packaged in this tubular film with and while both ends of the film are in open condition; (c) positioning oppositely disposed pairs of spreader probes so that each pair of probes enter an open end of a tubular film, the pair of probes in a close together condition and to a position near the ends of the product; (d) carrying each pair of probes in a probe support freely movable on a track and with entry of the spreader probes in the close together condition into the open end of the tubular film; (e) disconnecting the probe supports so the probes are free to move along the track; (f) moving the spreader probes apart after entering the ends of the tubular film, the free movement of the probes allowing one probe to engage the inside of the tubular film whereupon the other probe begins movement to provide a self-centering in the tubular end of the film and to cause the ends of the film to be formed into narrow mouths, with these mouth openings and the spreader probes being substantially equal distant from the theoretical center line of the tubular film; (g) limiting the apart movement of each pair of spreader probes so as to produce a controlled stretch and force to each of the tubular ends of the film; (h) releasing the apart force on the probes and withdrawing the spreader probes from the stretched elongated ends of the tubular film; (i) sealing the elongated openings of the tubular film as and after the probes have been at least partially removed from the ends of the film, and (j) removing the now packaged product from the apparatus.

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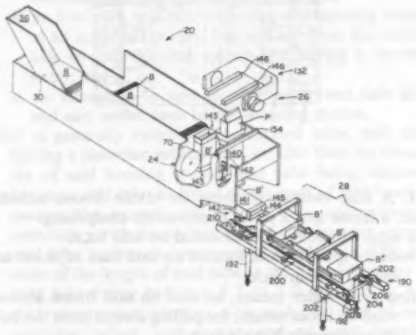
**4,024,693**

## CARTON FORMING APPARATUS

**William Leasure; Luis Garcia; Charles Reifel, and Jack Shelton, all of Houston, Tex., assignors to Mira-Pak, Inc., Houston, Tex.**

**Continuation-in-part of Ser. No. 570,504, April 22, 1975. This application Sept. 19, 1975, Ser. No. 614,903**
**Int. Cl.² B65B *43/32***
**U.S. Cl. 53—186** **32 Claims**



1. A device for forming a carton from a folded box blank having closable flaps at the ends thereof, the device comprising

rotatably mounted screw means for supplying a plurality of folded box blanks, the blanks being longitudinaly advanced upon the rotation of said screw means;

rotatable cam means for engaging and opening the box blanks upon the rotation of said cam means;

means for depositing a bag into the opened box blank; and

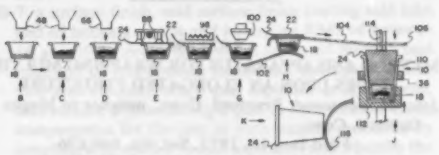
means for closing and sealing the end flaps of the box blank thereby forming a sealed carton.

**4,024,694**

## APPARATUS FOR FILLING AND ASSEMBLING CUPS AND PROCESS THEREFORE

**Marvin Cooper, 59 Fisherville Ave., Willowdale, and Gino Franco, 235 Margaret Drive, Oakville, both of Canada**

**Filed June 18, 1976, Ser. No. 697,675**
**Int. Cl.² B65B *1/12***
**U.S. Cl. 53—282** **9 Claims**



1. Apparatus for filling and assembling single serving beverage cups, said cups having a container of beverage concentrate secured therein, said apparatus comprising;

first conveyor means for carrying said containers;

means for placing said containers on said first conveyor means;

at least two beverage concentrate dispensing means located at spaced apart stations along said conveyor means, and being adapted to dispense beverage concentrate in predetermined measured quantities ino said containers;

container closure dispensing means for dispensing closures, and placing the same on said containers;

sealing means for sealing said closures on said containers;

second conveyor means for conveying said cups;

dispensing means for dispensing cups and placing the same on said second conveyor means;

transfer means for transferring said containers from said first conveyor means and placing same in registration with said cups on said second conveyor means; and

pressure means for engaging said containers and pressing same into the bottom of said cups.

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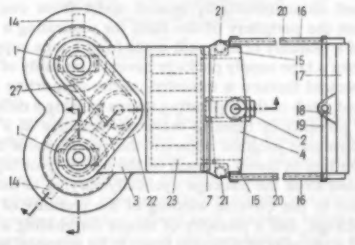
**4,024,695**

## LAWN MOWER

**Fritz Haseloff, Behringstrasse, 35 Kassel, Germany**

**Continuation-in-part of Ser. No. 449,257, March 8, 1974, abandoned. This application Aug. 7, 1975, Ser. No. 602,832**
**Int. Cl.² A01D *53/00***
**U.S. Cl. 56—15.4** **3 Claims**



1. A lawn mower construction, comprising a housing, power means mounted on the housing, a pair of rotors disposed within the housing and spaced laterally of the longitudinal center line of the mower, each of said rotors having a generally cup-shaped configuration and having an open bottom end, a shaft connected to the housing to rotatably support each rotor, means for connecting the power means to each rotor to thereby rotate the same, blade means carried by the lower end of each rotor, first wheel means located within the interior of each rotor and connected to the respective shaft, second wheel means located to the rear of said first wheel means and

disposed along the longitudinal center line of the mower, means for pivotally connecting the second wheel means to said housing, a handle connected to said housing, steering means movably mounted on the upper portion of the handle, and means interconnecting said steering means and said second wheel means for pivoting said second wheel means to thereby steer the mower.

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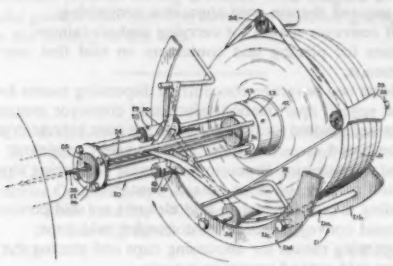
4,024,696

## METHOD AND APPARATUS FOR WRAPPING MULTIPLE TAPES UPON AN ELONGATED STRUCTURE

John M. Townsend, Branford, Conn., assignor to Magna Ply, Guilford, Conn.

Filed Dec. 15, 1975, Ser. No. 640,696
Int. Cl.[2] H01B *13/10, 13/08;* B65H *81/08*
U.S. Cl. 57—15 26 Claims



1. A machine for wrapping tape material in a helical manner about a length of an elongated structure, the machine having a winding head with a base portion, means for driving the head about a predetermined axis of rotation extending substantially perpendicular to a predetermined surface of the base portion, the head having an opening extending therethrough along the predetermined axis of rotation, means for advancing the elongated structure to be wrapped through the opening in the head in a direction extending substantially along the predetermined longitudinal axis, means attached to the predetermined surface of the base portion of the head for supporting thereon a supply package of traverse wound tape material, the improvement comprising a plurality of means attached to the head and disposed circumferentially spaced apart from one another adjacent the periphery of the head for separating a different tape of a plurality of different tapes from a tape supply package when a tape supply package having a plurality of different tapes wound thereon is mounted on the supporting means of the head, each of the separating means causing a different one of the plurality of tapes to leave the package at a different predetermined location adjacent the periphery of the package, the line of travel of each of the plurality of tapes being separated from the package cyclically varying in direction in response to the traverse winding of the plurality of tapes on the package, and a plurality of means for guiding a different tape of a plurality of different tapes to be wrapped at a predetermined helical angle with respect to the length of the conductor and to be wrapped with respect to the tape of the plurality adjacent thereto to be in one of the predetermined conditions of spaced apart, substantially abutting, and overlapping, each of the guiding means being mounted on the head circumferentially spaced apart from one another and disposed adjacent the predetermined axis of rotation of the head at a location adjacent the portion of the means for supporting the package which portion is positioned opposite the base.

22. A method of wrapping tape material in a helical manner about a length of an elongated structure with a plurality of different tapes from at least one tape supply package having a plurality of different tapes traverse wound thereon, the method comprising the steps of:

a. advancing the elongated structure to be wrapped in a predetermined direction;

b. rotating the supply package with respect to the line of advancement of the elongated structure;

c. separating a different one of the plurality of tapes from the tapes from the tape supply package, the separating causing a different one of the plurality of tapes to leave the package at a different predetermined location on the periphery of the rotating package;

d. guiding a different tape of the plurality of different tapes from the supply package toward the elongated structure to be wrapped thereabout, the different tape being guided to be wrapped at predetermined helical angle with respect to the length of the elongated structure and to be wrapped with respect to the tape of the plurality adjacent thereto in one of the predetermined conditions of the different tapes of the plurality being spaced apart, substantially abutting, and overlapping; and

e. wrapping the different tapes of the plurality of tapes being guided in one of the predetermined conditions of the tape of the plurality being spaced apart substantially abutting, and overlapping.

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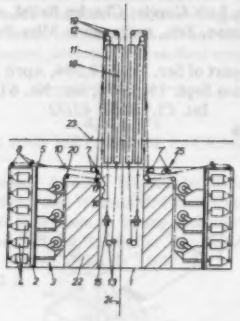
4,024,697

## FALSE TWISTING MACHINE

Erich Bücher, Goppingen, and Erich Scheutle, Weissenstein, both of Germany, assignors to Zinser Textilmaschinen GmbH, Ebersbach, Germany

Filed May 24, 1976, Ser. No. 688,971
Claims priority, application Germany, May 22, 1975, 2522601
Int. Cl.[2] D01H *13/28*
U.S. Cl. 57—34 HS 4 Claims



1. A false twisting machine for textile fibers, including a base, a frame and a set of components comprising:

a supply bobbin rack, mounted on said base;

wind up spool means, located on said base adjacent to said supply bobbin rack;

first draw roller means, located on said frame above said wind up spool means, for pulling thread from the bobbins on said supply bobbin rack;

first heater means, located above said first draw roller means;

false twisting means, located on said frame below said first heater means, and defining a thread cooling zone therewith;

second draw roller means, located on said frame below said false twisting means, for pulling thread through said first heater means and through said false twisting means;

second heater means, located above said first draw roller means and adjacent said first heater means; and

third draw roller means, located on said frame above said

wind-up spool means, for pulling thread through said second heater means and for guiding it to said windup spool means.

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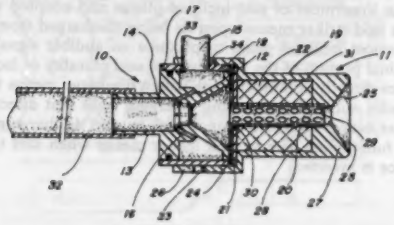
**4,024,698**

## ASPIRATOR MUFFLER

**William Robert Weiss, Walnut Creek, Calif.; James Judson Cooksey, Colonial Heights, and Wilbur Leon Stables, Matoaca, both of Va., assignors to Allied Chemical Corporation, Morris Township, N.J.**

**Filed July 16, 1976, Ser. No. 705,961**
**Int. Cl.² B65H *51/16***
**U.S. Cl. 57—34.5** **14 Claims**



1. An apparatus for use during the production of multifilament, synthetic yarn, said apparatus comprising:

A. an aspirator, said aspirator comprising:

A-1. an inlet end;

A-2. an outlet end;

A-3. a passageway connecting said inlet and said outlet ends; and

A-4. a source of air under pressure, said source of air under pressure being connected to said passageway so as to create an atmosphere productive of suction therethrough when operational; and

B. a muffler, said muffler comprising:

B-1. generally cylindrical housing means, said housing means comprising:

a. an outlet end, said outlet end being shaped so as to couple with said inlet end of said aspirator without blocking said passageway therethrough;

b. an inlet end, said inlet end conically tapering inward at an angle of between 30° and 60° from the central axis of said housing means and having a beveled entry; and

c. an elongated section extending between said inlet and said outlet ends of said housing means;

B-2. a generally cylindrical perforated tube, said tube having a diameter substantially smaller than the diameter of said housing means, said tube being disposed between said inlet and said outlet ends of said housing means, the central axis of said tube approximately coinciding with the central axis of said housing means, said tube having an open area of from 40 to 60%, the ratio of the length of said tube to the inside diameter of said tube being between 3.7 to 1.0 and 5.5 to 1.0, said tube communicating with said inlet end of said aspirator when said outlet end of said housing means is coupled therewith, said tube having a plurality of perforations the diameters of which are between 0.0685 and 0.0825 inch;

B-3. an end plate, said end plate having a hole therethrough with a diameter slightly greater than that of said tube, said plate being disposed approximately perpendicular to the central axes of said tube and said housing means and encircling the end of said tube closer to said outlet end of said housing means to thereby form in conjunction with said housing means said tube an annular resonant chamber;

B-4. sound absorbing material disposed throughout said annular resonant chamber;

B-5. means for mounting said housing means to said inlet end of said aspirator;

B-6. sealing means, said sealing means being disposed between said end plate and said inlet end of said aspirator so as to permit air to enter said inlet end of said aspirator only via said inlet end of said housing means; and

B-7. a surface finish, said surface finish coating said inlet end of housing means and having an RMS of between 40 and 60; whereby said yarn is aspirated through said inlet end of said housing means and through said tube into said aspirator when said aspirator is operational, said surface finish causing a gain in yarn tension which compensates for the loss in yarn tension produced by coupling said muffler to said aspirator, and whereby the audible noise emitted at said inlet end of said aspirator is reduced up to 22.5 Δ dB(A) and brought to within acceptable levels by the use of said tube, said resonant chamber, and said sound absorbing material.

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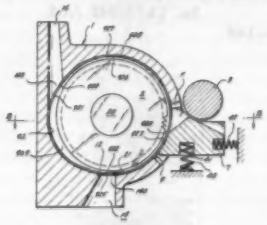
**4,024,699**

## SLIVER RESOLVING APPARATUS FOR OPEN-END SPINNING MACHINES

**Georg Goldammer, Gaimersheim, and Kurt Beitzinger, Ingolstadt, both of Germany, assignors to Schubert & Salzer Maschinenfabrik Aktiengesellschaft, Ingolstadt, Germany**

**Filed Oct. 10, 1975, Ser. No. 621,342**
**Claims priority, application Germany, Oct. 11, 1974, 2448584; Oct. 11, 1974, 2448585**
**Int. Cl.² D01H *1/12***
**U.S. Cl. 57—58.91** **25 Claims**



1. Silver resolving apparatus for an open-end spinning device including a resolving roller, a housing having a chamber for receiving the resolving roller, the wall of such chamber encircling the resolving roller periphery, such housing further having a plurality of openings therethrough communicating with the housing chamber, one of such openings being a silver infeed opening and another of such openings being a fiber discharge opening, and a fiber passage between the roller periphery and the chamber wall for travel of resolved fiber from the silver infeed opening to the fiber discharge opening in one circumferential direction, the improvement comprising thin wear-resistant liner means disposed in the housing chamber spaced from the resolving roller periphery substantially covering the housing chamber wall and forming the side of the fiber passage nearest the chamber wall, said liner means including a plurality of ports, one of said ports being a silver infeed port and another of said ports being a fiber discharge port, said liner means being disposed with said ports aligned with the corresponding housing openings.

**4,024,700**

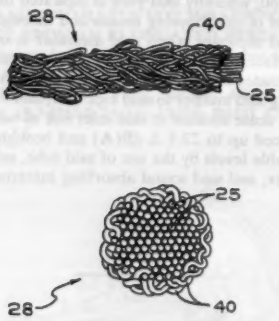
## BULKY YARN

**Warren W. Drummond, Allison Park, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 569,326, April 17, 1975, abandoned, which is a division of Ser. No. 452,106, March 18, 1974, Pat. No. 3,918,244. This application Apr. 6, 1976, Ser. No. 674,242**

**Int. Cl.² D02G *3/18***

**U.S. Cl. 57—144** **4 Claims**




**1. A twisted, low bulk density yarn having the appearance of a spun staple fiber yarn comprising a continuous strand core and a plurality of connected loops of continuous filaments or groups of filaments, said loops being entangled with each other and wrapped about and entangled with said strand core, to provide a bulky yarn.**

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**4,024,701**

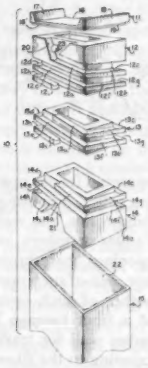
## GRAVITY POWERED TIMERS

**Wynne Rinnman Corson, 1046 Dodge Ave., Evanston, Ill. 60202**

**Filed Sept. 8, 1975, Ser. No. 611,141**

**Int. Cl.² G04F *1/08***

**U.S. Cl. 58—144** **5 Claims**



**1. A gravity powered timing device, comprising: a generally spherical striker means; a plurality of inclined planes successively communicating with each other to define a descending track of a predetermined finite length, each of said successively communicating descending inclined planes being arranged at substantially right angles to each other, whereby said plurality of inclined planes are characterized by a generally rectangular cross-sectional configuration, said inclined planes being adapted to receive said striker means for gravity-induced downward travel of said striker means along said track; the uppermost inclined plane of said plurality of successively communicating inclined planes including an entrance means comprising outwardly extending diverging walls which form a first feeder means that guides said striker means into said entrance means for subsequent travel along said descending track, speed retarding means at the terminal portion of said inclined planes for contacting said spherical striker means when it reaches the terminal portion of said inclined plane to controllably retard the gravity-induced downward travel of said spherical striker means as it travels from each of said inclined planes to the next succeeding inclined plane of said track; and, a sounding plate positioned at the terminal portion of the lowermost of said inclined planes and adapted to receive said striker means upon its being discharged from said lowermost inclined plane to produce an audible signal, the terminal portion of the lowermost of said plurality of inclined planes directly communicating with a discharge means which includes outwardly extending diverging walls that direct said striker means onto said sounding plate, said discharge means also functioning as a second feeder means when said timing device is inverted.**

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**4,024,702**

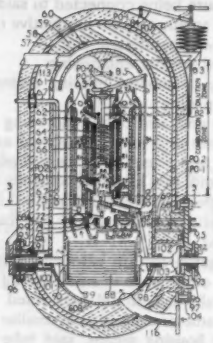
## COMBUSTION PRODUCTS PRESSURE GENERATORS CONTINUOUS BURNER TYPE AND ENGINES

**Perry David Hudson, 515 Delaine Drive, Corpus Christi, Tex. 78411**

**Filed Sept. 23, 1970, Ser. No. 74,703**

**Int. Cl. F02g *1/02***

**U.S. Cl. 60—39.27** **10 Claims**



**1. I claim, a combustion products generator consisting of a constant pressure combustion chamber which is a pressure vessel having one or more fuel burners located inside said combustion chamber, a means to inject atomized fuel into said burners, a continuous means of ignition communicating with each burner, a means of forced circulation of a portion of the air within said combustion chamber through said burners for combustion air, a means of forced circulation of a portion of the air within said combustion chamber into the hot gases from said burners to dilute and cool said gases to workable temperatures, all internal parts to be made of heat resistant materials, a means to measure the volume of the air flow coming into said combustion products generator, a means to open or close the fuel valves to said fuel burners one at a time in ratio to volume of air so measured, an outlet opening in said combustion chamber, an inlet opening to said combustion chamber, said inlet opening connected to a source of air under pressure.**

4,024,703

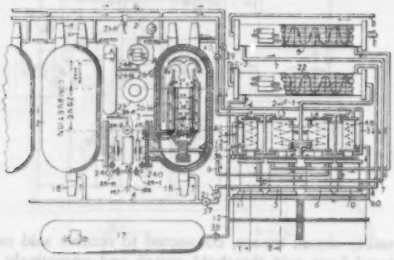
## COMBUSTION IN COMBUSTION PRODUCTS PRESSURE GENERATOR INTERMITTENT BURNER TYPE AND ENGINES

Perry D. Hudson, 515 Delaine Drive, Corpus Christi, Tex. 78411

Continuation-in-part of Ser. No. 189,444, Oct. 14, 1971, abandoned, which is a division of Ser. No. 34,302, May 4, 1970, Pat. No. 3,775,973. This application Jan. 28, 1974, Ser. No. 437,462

Int. Cl. F02g *3/02*

U.S. Cl. 60—39.03 19 Claims



3. A combustion cycle for a plurality of two stage combustion products pressure generators employed in multiples of three, having an intermittent heating cycle, each pressure generator having a combustion air inlet opening, a combustion air inlet valve to control the flow there through, a low pressure discharge outlet opening, a low pressure discharge valve to control the flow there through, and a high pressure discharge outlet opening, a high pressure discharge valve to control the flow there through, a control system which operates the valves, fuel injection and ignition in three intermittent steps, and a fan means within the pressure generator, a method of operating each of said combustion products pressure generators in three sequential steps comprising; step

4,024,704

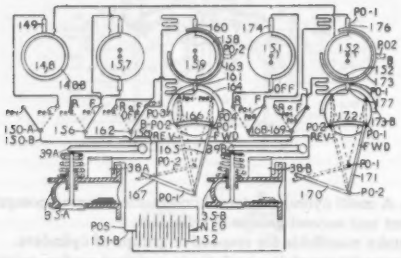
## COMBUSTION PRODUCTS PRESSURE GENERATOR CONTINUOUS BURNER TYPE AND ENGINES

Perry D. Hudson, 515 Delaine Drive, Corpus Christi, Tex. 78411

Continuation-in-part of Ser. No. 74,703, Sept. 23, 1970. This application Aug. 28, 1972, Ser. No. 284,431

Int. Cl.[2] F02G *1/02*, *3/02*; F01B *29/04*; F01L *25/08*

U.S. Cl. 60—39.25 6 Claims



1. I claim, in combination, a reciprocating piston engine using a pressure fluid medium for power, and comprising at least one power cylinder, a charge valve for each power cylinder; a valve spring biasing said valve in a closed position; an exhaust valve for each power cylinder; a rocker arm shaft; a charge valve rocker arm pivotally mounted on said rocker arm shaft and engaging said charge valve; valve operating push rods operatively engaging said rocker arm; two camshafts for selectively actuating said rocker arm, one camshaft for operating the charge and exhaust valves on clockwise rotation of said engine, one camshaft for operating the charge and exhaust valves on counter clockwise rotation of said engine, a means of switching the valve operating push rods from the clockwise rotation camshaft to the reverse camshaft for counter clockwise rotation, and switching back for clockwise rotation of said engine, each half of the charge valve rocker arms to be hinged on the rocker arm shaft, the two halves are locked together by a magnet and electro magnetic contact plates when the magnet is energized by an electric timer means; when the magnet is de-energized by said electric timer; the charge valve is closed by said valve spring; a means to reverse the sequence of charge valve closing by said contact timer at the same time push rods are switched from clockwise rotation camshaft to counter clockwise rotation camshaft, said electric contact timer means to energize each of said magnetic plates in sequence so that the said camshafts will open each charge valve in sequence when the piston in that power cylinder is on top dead center of the power stroke, said electric contact timer to have a variable contact means to de-energize each said contact plate in sequence and close said charge valve at the point in the power stroke required to control the power and speed of said engine as desired.

4,024,705

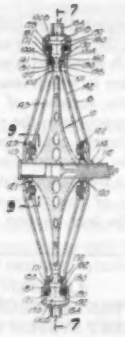
## ROTARY JET REACTION TURBINE

Lewis W. Hedrick, Woodland Hills, Calif. 91364

Continuation of Ser. No. 433,363, Jan. 14, 1974, abandoned, and a continuation-in-part of Ser. No. 179,671, Sept. 13, 1971, abandoned, and Ser. No. 345,233, March 26, 1975, abandoned, said Ser. No. 179,671, is a continuation-in-part of Ser. No. 134,574, April 16, 1971, abandoned. This application Apr. 14, 1975, Ser. No. 568,116

Int. Cl.[2] F02C *3/16*

U.S. Cl. 60—39.16 C 20 Claims



1. A jet type engine including:

a. a rotor of full circular form having an output shaft rotatable about an axis;

b. a combustion chamber near the periphery of said rotor;

c. a combustion supporting fluid passageway in said rotor extending from an inner portion of said rotor to said combustion chamber, and a fuel channel in said rotor extending to said combustion chamber, there being means whereby rotation of said rotor causes the combustion supporting fluid in said passageway to be compressed and heated prior to entering said combustion chamber;

d. a jet channel in said rotor in communication with said combustion chamber to exhaust the burned fuel from said combustion chamber and produce a jet reaction, the burning of said fuel being produced at least in part as a result of the heating of said combustion supporting fluid in its passage through said passageway;

e. a turbine structure rotatably supported about said axis

and including means against which said burned fuel impinges to rotate said turbine structure; and

f. means to prevent said turbine structure from rotating as fast as said rotor.

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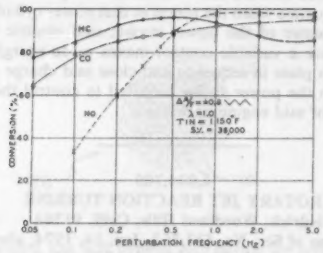
**4,024,706**

## METHOD OF IMPROVING THE OPERATIONAL CAPACITY OF THREE-WAY CATALYSTS

**Marwan K. Adawi, Westland; Allan D. Briggs, Melvindale; Robert G. DeLosh, Ann Arbor, and Carol S. Smith, Detroit, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.**

**Filed Jan. 7, 1976, Ser. No. 645,006**
**Int. Cl.² F02B** *75/10;* **F01N** *3/15*
**U.S. Cl. 60—274** **6 Claims**




1. A method for widening the range of air-fuel ratios over which a three-way catalyst having an oxygen storage capacity is operative when fresh both in oxidizing at least 80% of unburned hydrocarbons and carbon monoxide, and in reducing 80% of oxides of nitrogen contained in an exhaust gas stream delivered to the three-way catalyst from an engine, which method comprises:

supplying to the engine to be burned therein an air-fuel mixture in which the fuel to air ratio is varied from a rich condition in which more fuel is present than air to burn it to a lean condition in which less fuel is present than the air to burn it, the variance of the air-fuel ratio being displaced equal amounts to the rich and to the lean sides from a stoichiometric condition with the cycle of displacement to the rich and lean sides being generally identical and of a frequency that insures that the oxygen storage capacity of the three-way catalyst is not exhausted during the lean portion of the cycle.

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**4,024,707**

## APPARATUS FOR THE CONTROL OF AIR ADMISSION TO THE EXHAUST SYSTEM OF AN INTERNAL COMBUSTION ENGINE INCLUDING A SAFETY CIRCUIT MEANS

**Peter Jürgen Schmidt, Schwieberdingen, and Harald Kizler, Stuttgart, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany**

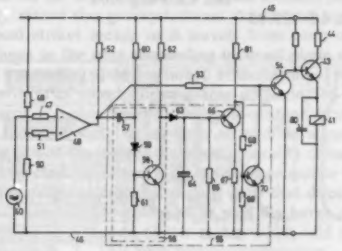
**Filed May 9, 1975, Ser. No. 575,995**
**Claims priority, application Germany, May 11, 1974, 2422938**
**The portion of the term of this patent subsequent to Sept. 9, 1992, has been disclaimed.**
**Int. Cl.² F01N** *3/10*
**U.S. Cl. 60—276** **3 Claims**

1. In a regulating system for an internal combustion engine which includes an exhaust gas post-combustion system and an oxygen sensor, located in the exhaust system, for determining the chemical composition of the exhaust gases, and which further includes means for admitting air directly to said exhaust system, said means including at least one electromagnetic valve, the improvement comprising:

A. a control apparatus, connected to said oxygen sensor to receive signals therefrom and including

i. a threshold switch, responsive to said signals from said oxygen sensor and delivering an output signal;

ii. first transistor means, connected to be controlled by said output signal from said threshold switch; and connected to energize said at least one electromagnetic valve; whereby the quantity of air supplied to the exhaust gas of the engine may be changed; and



B. safety circuit means, connected to receive said output signal from said threshold switch and operatively connected to said first transistor means; whereby, when said output signal from said threshold switch remains constant, the safety circuit means actuates said first transistor means to cause said means for admitting air to said exhaust system to admit the maximum amount of air.

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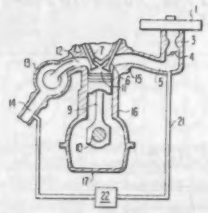
**4,024,708**

## MULTI CYLINDER INTERNAL COMBUSTION ENGINE

**Takashi Takemoto, Nagaokakyo, Japan, assignor to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 4, 1975, Ser. No. 637,795**
**Claims priority, application Japan, Dec. 4, 1974, 49-147239**
**Int. Cl.² F02B** *75/10;* **F02M** *25/06*
**U.S. Cl. 60—278** **4 Claims**



1. A multi cylinder internal combustion engine comprising:

first and second groups of cylinders,

intake manifolds for respective groups of cylinders,

means for supplying a relatively enriched air-fuel mixture to said first group of cylinders,

means for supplying a relatively lean air-fuel mixture to said second group of cylinders,

means for purifying exhaust gas by oxidation thereof,

said latter means being positioned to gather exhaust gas from all said cylinders and to subject the same to oxidation reaction, and

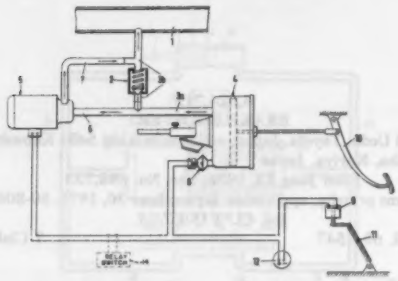
means for diverting exhaust gas from said purifying means to the intake manifold of said first group of cylinders only.

4,024,709

## BRAKE SYSTEM FOR AUTOMOTIVE VEHICLE EQUIPPED WITH OTTO ENGINES

Hans Erdmann, Neu-Isenburg, Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed Feb. 6, 1976, Ser. No. 655,807
Claims priority, application Germany, Feb. 12, 1975, 2505880
Int. Cl.² F15B *20/00*
U.S. Cl. 60—397 3 Claims



1. A brake system for use in automotive vehicles equipped with Otto engines including a vacuum operated brake booster and a vacuum pump, said vacuum pump being positioned between the brake booster and the induction pipe for said Otto engine including:

means for automatically switching on said vacuum pump only when there is insufficient amount of vacuum in the brake booster and at the same time there is a predetermined amount of vacuum in said induction pipe, and

further including means for switching on the vacuum pump only while the Otto engine is running, which means includes a pressure switch associated with said brake booster and a limit switch associated with the accelerator pedal for said engine which is actuated only when said accelerator pedal is released.

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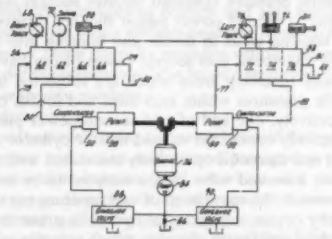
4,024,710

## LOAD SENSING HYDRAULIC CIRCUIT HAVING POWER MATCHING MEANS

Lester L. Zelle, Waverly, Iowa, assignor to Koehring Company, Milwaukee, Wis.

Filed Mar. 25, 1976, Ser. No. 670,151
Int. Cl.² F15B *13/09*; F16H *39/46*
U.S. Cl. 60—420 18 Claims



1. A hydraulic circuit for operating a plurality of hydraulic actuators connected to loads, the circuit being powered by a prime mover engine and comprising:

variable displacement hydraulic pump means drivable by the engine;

signal responsive pump displacement control means operatively associated with the hydraulic pump means for controlling the volumetric output of the pump means;

a valve means connected to the pump means and having a plurality of valve sections operatively associated with the hydraulic actuators for controlling flow to energize the actuators to drive the loads;

means coupled to each of the valve sections and to the pump displacement control means for providing a load pressure signal to the displacement control means for causing the latter to adjust the volumetric output from the pump means to a quantity sufficient to provide a pump means output pressure having a preselected pressure differential over the load pressure; and

speed sensing means operatively associated with the engine for providing a signal indicative of the engine speed, the speed sensing means being operatively associated with the displacement control means for simultaneously adjusting the volumetric output of the pump means at the preselected pressure differential over the load pressure and the power demand on the engine responsive to a change in engine speed.

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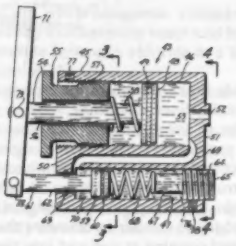
4,024,711

## THROTTLE CONTROL MECHANISM FOR AN ENGINE

Wayne B. Russell, Jr., 3895 Lugo Ave., Lynwood, Calif. 90262

Division of Ser. No. 540,396, Jan. 13, 1975, Pat. No. 3,973,472. This application June 4, 1976, Ser. No. 692,961
Int. Cl.² F16D *31/00*; F15B *13/06*
U.S. Cl. 60—423 7 Claims



1. In combination, an engine having a throttle arm, a hydraulic pump driven by the engine, and a throttle control mechanism

said throttle control mechanism comprising:

a first cylinder with a closure at each end thereof;

a first piston reciprocatable within said first cylinder;

a first piston rod connected to said first piston and extending through are of said first cylinder closures to the exterior of the first cylinder;

a second cylinder with a closure at each end thereof;

a second piston reciprocatable within said second cylinder;

a second piston rod connected to said second piston and extending through one of said second cylinder closures to the exterior of said second cylinder;

a member pivoted to both said piston rods at respective positions outside of said cylinders;

fluid inlet means into a region of said first cylinder at one side of the first piston and into a region of said second cylinder at one side of the second piston;

whereby pressurized fluid introduced through said fluid inlet means into said cylinders urges both said pistons to move longitudinally within their respective cylinders;

means uring each piston to move longitudinally in the direction opposite that in which the fluid pressure is urging it;

the longitudinal axes of said cylinders being oriented relative to each other so that when said pistons move in the directions in which they are urged by the fluid pressure each piston has a component of motion in the direction opposite that of the other piston;

linkage means connecting said pivoted member with said

throttle arm, and a hydraulic conduit leading from the outlet of said pump to said fluid inlet means,

whereby increased fluid pressure at the pump outlet moves said pivoted member in a direction which further opens the throttle.

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**4,024,712**

## FLUID PRESSURE CONTROL DEVICE WITH A FLUID FAILURE ALARM FOR A VEHICLE BRAKE SYSTEM

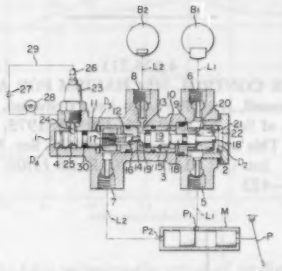
**Hiroo Takeuchi, Ueda, Japan, assignor to Nisshin Kogyo Kabushiki Kaisha, Ueda, Japan**

**Filed June 24, 1975, Ser. No. 589,922**

**Claims priority, application Japan, Nov. 15, 1974, 49-131796**

**Int. Cl.² F15B 7/00**

**U.S. Cl. 60—535** **4 Claims**



**1.** In a vehicle brake system of the type including two independent hydraulic lines extending from a dual type brake master cylinder to the front and rear wheel brakes, respectively, a fluid pressure control device positioned between the master cylinder and the front and rear wheel brakes, said fluid pressure control device comprising: a cylinder casing (**1**) defining therein a first cylinder chamber (**2**) and a second cylinder chamber (**3**) smaller in diameter than said first cylinder chamber and opening at one end into the latter in aligned relation therewith, a first pressure bearing piston (**9**) slidably fitted in said first cylinder chamber, a second pressure bearing piston (**10**) slidably fitted in said second cylinder chamber, a first core piston (**18**) slidably fitted in said first pressure bearing piston (**9**) and extending axially therethrough, a pressure adjusting spring (**22**) arranged between said first pressure bearing piston and said first core piston to bias the latter axially toward said second pressure bearing piston, a cylinder bore (**15**) formed in said second pressure bearing piston so as to open into said first cylinder chamber and having a diameter larger than that of said first core piston, means for placing said cylinder bore in fluid communication with the fluid chambers of the rear wheel brakes, a second core piston (**19**) slidably fitted in said cylinder bore and held in engagement with the adjacent end of said first core piston, a first fluid space defined in said first cylinder chamber (**2**) on the pressure bearing face of said first pressure bearing piston (**9**) and communicating on the one hand with one of the two output ports, ($P_1$), of the dual brake master cylinder (**M**) and on the other hand with the fluid chambers of the front wheel brakes ($B_1$), a second fluid space defined in said second cylinder chamber (**3**) on the pressure bearing face of said second pressure bearing piston (**10**) and communicating with the other output port ($P_2$) of the dual brake master cylinder, a fluid passage formed in said second pressure bearing piston and communicating said cylinder bore with said second fluid space, valve means arranged in said fluid passage so as to be normally held open under the bias of said pressure adjusting spring acting thereon through the medium of said first and second core pistons and switch means on said cylinder casing and operatively associated with said second core piston to actuate an external alarm means in response to axial movement of said second core piston and second pressure bearing piston.

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**4,024,713**

## BRAKE BOOSTER

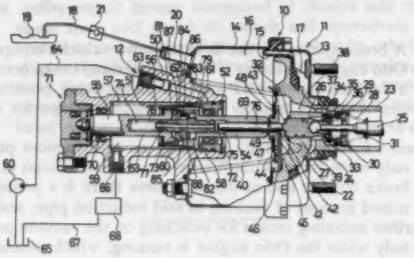
**Atsumi Ueda, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

**Filed June 22, 1976, Ser. No. 698,733**

**Claims priority, application Japan, June 30, 1975, 50-80637**

**Int. Cl.² F15B 7/08**

**U.S. Cl. 60—547** **7 Claims**



**1.** A brake booster assembly operatively associated with a master cylinder, comprising:

a differential air-vacuum pressure operated booster section including a body, a first power piston slidably received within said body so as to divide said body into first and second chambers, an input means operatively associated with a brake pedal, a first valve means adapted to be actuated in response to the movement of said input means so as to thereby create a differential air pressure between said first and second chambers which actuates said first power piston, and a reaction mechanism interposed between said first power piston and said input means;

a hydraulic pressure operated booster section including a housing, a second power piston slidably recieved within said housing so as to divide said housing into third and fourth chambers, said second power piston having equal pressure receiving areas which are subjected to the hydraulic pressures within said third and fourth chambers, respectively, one end of said second power piston being operatively connected to said master cylinder while the other end thereof is operatively associated with said input means, a second valve means adapted to be actuated in response to the movement of said input means to so as to thereby create a differential hydraulic pressure between said third and fourth chamber which actuates said second power piston, and a hydraulic reaction means provided within said second power piston for generating reaction force to be transmitted to said input means in response to the actuation of said second valve means; and

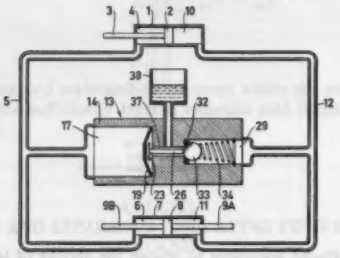
a delay means for actuation of one of said first and second valve means by a further movement of said input means after the booster section, operatively associated with the other of said first and second valve means, is actuated by an initial movement of said input means and reaches its run-out condition.

4,024,714

## VALVE MECHANISM

Lars-Gunnar Nordin, 4 Drejargatan, S-113 42 Stockholm, Sweden

Continuation of Ser. No. 450,538, March 12, 1974, abandoned. This application June 6, 1975, Ser. No. 584,441
Claims priority, application Sweden, Mar. 12, 1973, 7303429
Int. Cl.² F15B 7/10
U.S. Cl. 60—572 1 Claim




1. A master-slave hydrostatic movement transmitting system which comprises in combination:

a. a master unit which exerts hydraulic pressure when moved,

b. a slave unit which moves by virtue of the pressure exerted by the master unit,

c. a first pipe connecting a first side of said master unit with a first side of said slave unit,

d. a second pipe connecting a second side of said master unit with a second side of said slave unit,

e. said master unit and said slave unit each including a piston movable back and forth within a piston cylinder, the piston in said master unit having a piston rod on only one side of its piston while the slave unit has a piston rod on both sides of its piston,

f. a passageway extending between said first pipe and said second pipe,

g. a movable barrier extending across said passageway so as to at all times block liquid flow between said first and second pipes and so as to divide said passageway into a first passageway portion and a second passageway portion, said first passageway portion and said second passageway portion being entirely separate from each other, said barrier being partially movable within said passageway under the influence of the liquid pressure in either of said passageway portions,

h. a liquid reservoir,

i. said liquid reservoir being connected to said first passageway portion and not to said second passageway portion, said connection between said reservoir and said first passageway portion consisting of a conduit between said reservoir and said first passageway portion,

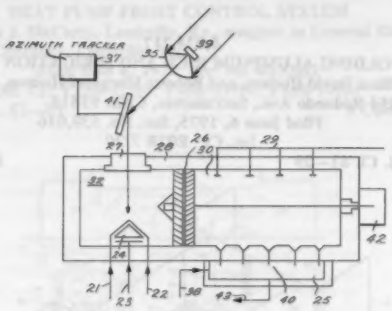
j. a valve mechanism resiliently mounted in said first passageway portion for controlling the flow of fluid through said first passageway portion for biasing said valve mechanism toward a closed position, valve opening means extending between said movable barrier and said valve mechanism so that movement of the movable barrier in one addition will cause said valve opening means to move said valve mechanism against its resilient mounting and open said first passageway portion to the flow of fluid between said reservoir and said first pasageway portion.

4,024,715

## SOLAR REACTOR ENGINE

Robert L. Scragg, and Alfred B. Parker, both of 2937 SW. 27th Ave., Miami, Fla. 33133

Continuation-in-part of Ser. No. 564,087, April 1, 1975. This application June 20, 1975, Ser. No. 588,888
Int. Cl.² F03G 7/02; F01K 25/08, 11/00
U.S. Cl. 60—641 11 Claims




1. A solar reactor engine comprising:

a solar reactor chamber,

means for controllably coupling chlorine and hydrogen to said solar reactor chamber,

means for directing electromagnetic radiation into said chamber to thereby exothermicly react said hydrogen and chlorine to generate hydrogen chloride at a high pressure and temperature level,

a turbine forming at least a portion of at least one wall of said reaction chamber,

said pressurized hydrogen chlorine driving said turbine,

said turbine driving a power utilization device,

an exhaust chamber positioned on the side of said turbine opposite from said reactor chamber,

means for converting said hydrogen chloride to hydrochloric acid to thereby form a partial vacuum in said exhaust chamber,

said partial vacuum increasing the pressure differential across said turbine to thereby increase the efficiency thereof, and

means for conveying said hydrochloric acid away from said exhaust chamber.

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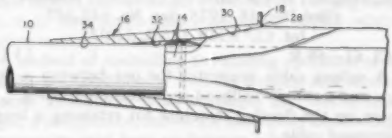
4,024,716

## IRRIGATION TUBING COUPLING FASTENER

Ray Brown Duggins, Chadds Ford, Pa.; Peter Garrett Mackauf, San Diego, Calif., and David Little Withington, Phoenix, Ariz., assignors to E. I. DuPont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 554,565, March 3, 1975, abandoned. This application Sept. 16, 1976, Ser. No. 723,960
Int. Cl.² E02B 13/00; F16L 33/18
U.S. Cl. 61—13 5 Claims




1. A joint comprising a semi-rigid connecting tube of uniform external diameter, a compressible O-ring engaging the external surface of said connecting tube, a porous tube tele-

scoped over one end of said connecting tube and covering said O-ring, and a tubular sheath telescoped over said porous tube, said tubular sheath engaging said porous tube and causing compression of the O-ring between said porous tube and said connecting tube, which tubular sheath has an inner surface tapered to a circumference just large enough to accommodate said connecting tube.

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**4,024,717**

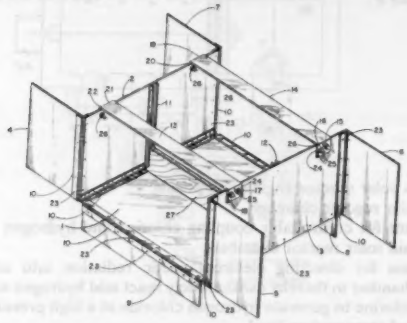
## FOLDING ALUMINUM RICE AND IRRIGATION BOX

**William David Hudson, and Bobette Margaret Hudson, both of 254 Redondo Ave., Sacramento, Calif. 95815**

**Filed June 6, 1975, Ser. No. 538,016**

**Int. Cl.² E02B** *7/20*

**U.S. Cl. 61—29** **1 Claim**



1. A folding, hinged box for regulating the flow of water for field crops using one primary water source, the improvement consisting of at least one folding box, adapted to be positioned in an earthen cutout corresponding to the box dimensions, comprised of a generally rectangular body having a horizontal floor member, with hinged vertical side panels, a water control panel, a vertical channel midway in the interior of said box, for positioning said water control panel for regulating the water flow from the top, hinged horizontal bottom flaps attached to the floor member, and hinged vertical side flaps attached to the hinged vertical side panels, said hinged side panels, bottom flaps and vertical side flaps enabling said box to be folded, and means to enable easy removal and replacement of said hinged members consisting of removable hinge pins in each of said hinges whereby damaged members may be removed and replaced, said box being maintained in an open position by two top strap braces attached horizontally by bolts near the top edge of each of said side panels.

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**4,024,718**

## SUBSEA CABLE APPARATUS AND METHOD OF HANDLING SAME

**Joseph R. Roche, and Frank Allan Bryant, both of Houston, Tex., assignors to The Offshore Company, Houston, Tex.**

**Filed Dec. 18, 1975, Ser. No. 642,137**

**Int. Cl.² E21B** *15/02, 33/035*

**U.S. Cl. 61—69 R** **13 Claims**

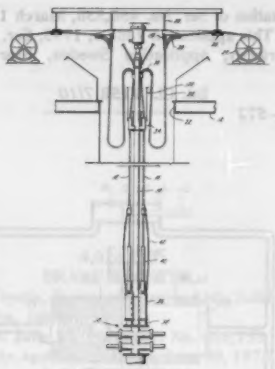
1. A subsea cable apparatus for use between a floating surface and a subsea wellhead apparatus comprising,

means on the floating structure for retaining a length of armored cable,

an armored cable extending from said floating structure to said subsea wellhead apparatus,

means for connecting said cable to said subsea wellhead apparatus, and

telescoping means including shock absorbing means connected to said cable and engageable with said subsea



wellhead apparatus to absorb the shocks of landing the cable on said subsea wellhead apparatus.

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**4,024,719**

## REINFORCED ROAD FOUNDATION AND METHOD FOR MAKING SAID ROAD FOUNDATION

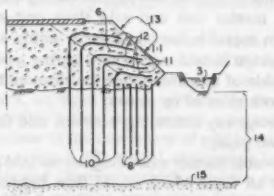
**Paul Risseeuw, Velp, Netherlands, assignor to Akzona Incorporated, Asheville, N.C.**

**Filed Feb. 5, 1976, Ser. No. 655,448**

**Claims priority, application Netherlands, Feb. 8, 1975, 7501525**

**Int. Cl.² E02D** *5/00;* **E01C** *3/00*

**U.S. Cl. 61—50** **12 Claims**



1. A method for the preparation of a foundation, and especially a structure serving as foundation for highways, comprising permanently and deeply embedding a plurality of flexible piles in the subsoil so that a first portion of each of said piles extends from essentially a vertical direction to an angle of about 45° to the vertical and extending a second portion of at least one of said piles in a transverse direction through at least part of the foundation.

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**4,024,720**

## TRANSPORTATION OF LIQUIDS

**Moses Dimentberg, deceased, late of Winnipeg, Canada, and by Myer Dimentberg, executor, 5830 Wolsely Ave., Cote St. Luc, Quebec, Canada**

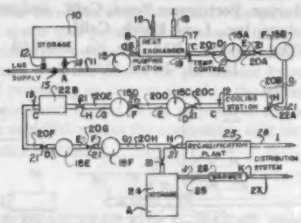
**Filed Apr. 4, 1975, Ser. No. 564,869**

**Int. Cl.² F17C** *7/02*

**U.S. Cl. 62—55** **11 Claims**

1. The method of transporting low temperature liquids such as liquefied natural gas and the like, from a supply point by passing the liquid stream through a pumping station where the pressure of said liquid is raised and then passing the liquid through a heat exchanger where the temperature of said liquid

is raised to a value in the range of between −200° F and −120° F, and then passing said liquid through insulated transportation pipeline and maintaining a pressure within the transmission pipeline sufficiently high to maintain said liquid in the said range.



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## 4,024,721

## METHOD AND APPARATUS FOR LAYING PIPES IN THE GROUND

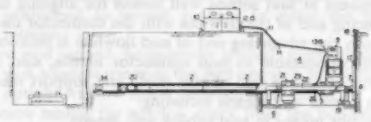
Hiroshi Takada, and Kenzo Hoashi, both of Yokohama, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Dec. 22, 1975, Ser. No. 643,119

Claims priority, application Japan, May 23, 1974, 49-057323

Int. Cl.² F16L *1/00*

U.S. Cl. 61—72.7 11 Claims



1. A method of laying pipes in the ground comprising:

a. digging a departure pit and an arrival pit which is spaced apart from the departure pit;

b. providing a propulsion jack in said departure pit, said propulsion jack being adapted to propel the pipes to be laid in;

c. pressing a pilot head into the ground by the pressure from said propulsion jack;

d. pressing pilot pipes successively into the ground by said propulsion jack, said pilot pipes being laid in following relation to said pilot head;

e. measuring the position and posture of said pilot head laid in the ground from within said departure pit, while the pilot head is being laid in;

f. controlling said pilot head to make a straight advance based on said measurement, thereby laying the pipes in the ground between the departure pit and the arrival pit;

g. providing hauling means in said pilot pipes for conveying earth to the arrival pit, said earth being scraped;

h. connecting an excavator to said hauling means, said excavator being adapted to excavate earth in following relation to said pilot pipes;

i. pressing said pilot pipes said hauling means and said excavator by said propulsion jack disposed in the departure pit while said hauling means and the scraping means of said excavator are driven to rotate;

j. scraping off the earth located forward of the excavator by the scraping means of the latter;

k. pressing laid-in pipes by said propulsion jack in following relation to said excavator as the latter scrapes off the earth;

l. discharging the scraped earth into said arrival pit through said pilot pipes by said hauling means; and

m. collecting successively at said arrival pit said laid-in pilot pipes and said hauling means disposed in the laid-in pilot pipes.

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## 4,024,722

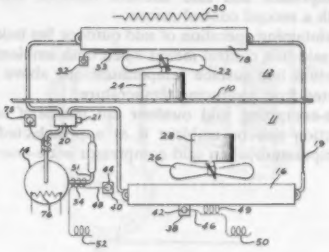
## HEAT PUMP FROST CONTROL SYSTEM

William J. McCarty, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed May 6, 1976, Ser. No. 683,882

Int. Cl.² F25B *41/00*; F25D *21/06*; F25B *13/00*

U.S. Cl. 62—81 9 Claims



1. In a self-contained air conditioning unit for heating and cooling an enclosure, an outdoor heat exchanger and indoor heat exchanger, a compressor, means for selectively connecting said compressor to said heat exchangers whereby said outdoor heat exchanger functions as an evaporator during operation of said unit on the heating cycle and said indoor heat exchanger functions as an evaporator during operation of said unit on the cooling cycle, fan means for moving enclosure air through said indoor heat exchanger, fan means for moving outdoor ambient air through said outdoor heat exchanger, an air conditioner heating cycle control system comprising:

a first control means including a sensing element having one portion being exposed to the surface temperature of said outdoor heat exchanger and a second portion being exposed to the ambient outdoor temperature, means under control of said portions for maintaining operation of said compressor in the heating cycle when both ambient and said heat exchanger surface temperature sensed by said portions are above a preselected frost producing temperature and to de-energize said compressor when either of said portions senses a preselected frost producing temperature;

a second control including a sensing element having one portion being exposed to the suction line temperature adjacent said compressor and a second portion being exposed to said ambient outdoor temperature, means under control of said portions for maintaining operation of said outdoor fan independent of said first control when both ambient and the suction line surface temperature sensed by said portions are above a preselected frost producing temperature and to complete a circuit to said fan through said first control if either of the portions of said second control senses a preselected frosting temperature to de-energize said outdoor fan means when said compressor is de-energized.

8. A method of controlling the heating operation of a self-contained air conditioning unit for heating and cooling an enclosure, an outdoor heat exchanger and indoor heat exchanger, a compressor, means for selectively connecting said compressor to said heat exchangers whereby said outdoor heat exchanger functions as an evaporator during operation of said unit on the heating cycle and said indoor heat exchanger functions as an evaporator during operation of said unit on the cooling cycle, fan means for moving enclosure air through said

indoor heat exchanger, fan means for moving outdoor ambient air through said outdoor heat exchanger comprising:

a. a first control means for:

1. sensing the surface temperature of said outdoor heat exchanger and the ambient outdoor temperature with a first control means;

2. maintaining operation of said unit in the heating cycle when both ambient and said heat exchanger surface temperature are above a preselected frost producing temperature;

3. de-energizing said compressor when either the heat exchanger or ambient is at a preselected frost producing temperature;

b. a second control means for:

1. sensing the suction line temperature adjacent said compressor and said ambient outdoor temperature with a second control means;

2. maintaining operation of said outdoor fan independent of said first control means when both ambient and the suction line surface temperature are above a preselected frost producing temperature;

3. de-energizing said outdoor fan means if either the suction line or ambient is at a preselected frosting temperature when said compressor is de-energized.

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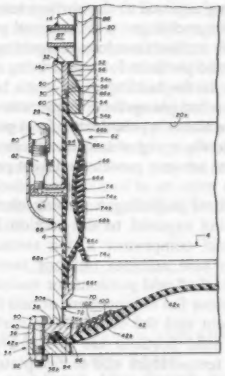
**4,024,723**

## PLATFORM LEG DIAPHRAGM

**Windel O. Mayfield; Clarence T. Thomerson, and Tom C. Waldrop, all of Corsicana, Tex., assignors to Regal Tool & Rubber Co. Inc., Corsicana, Tex.**

**Filed June 24, 1976, Ser. No. 699,322**
**Int. Cl.² E02D 5/14**
**U.S. Cl. 61—98** **10 Claims**



1. In an offshore platform to be erected on hollow legs which receive piles driven through said legs into the ocean floor, the combination which comprises:

a. a resilient diaphragm closing each of said legs to prevent ingress of water as said platform is moved into position; and

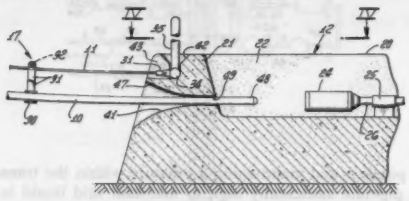
b. a ring of down facing cutter blades oriented in the upper surface of said diaphragm for registration with a down moving end of said piling to sever said diaphragm and facilitate passage of the end of said piling beyond the location of said diaphragm.

**4,024,724**

## MEANS AND METHOD FOR MAKING A FLOWLINE CONNECTION TO A SUBSEA CONNECTOR MEANS

**Edward E. Horton, Portuguese Bend, Calif., assignor to Deep Oil Technology, Inc., Long Beach, Calif.**

**Filed May 25, 1972, Ser. No. 256,740**
**Int. Cl.² F16L 35/00**
**U.S. Cl. 61—110** **6 Claims**



1. In an apparatus for connecting a flowline to a subsea well means at a subsea location, the combination of:

connector means at said subsea well means adapted to receive an end of a flowline in approximately axial alignment;

flexible guide and support tension means for said flowline extending from a vessel carrying a supply of flowline;

means connecting one end of said guide and support means to said subsea well means near said connector means;

means on said vessel for controlling tension of said guide and support means to maintain the guide and support means in a preselected curve while said flowline is advanced along said guide and support means toward said subsea well means;

and means at said subsea well means for aligning the advancing end of the flowline with the connector means,

whereby the advancing end of said flowline is receivable in and connectable to said connector means, said means connecting one end of said guide and support means to the subsea well means including

an anchor means in said subsea well means,

said anchor means including an anchor receptor having a top transverse opening and a longitudinal opening extending in the direction of the following to be laid.

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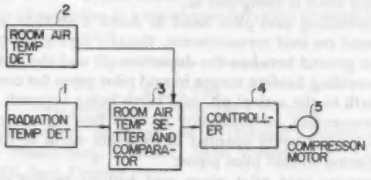
**4,024,725**

## CONTROL SYSTEM FOR AN AIR CONDITIONER

**Motokazu Uchida, Tokyo; Taisei Hosoda; Hideo Uzuhashi, both of Tochigi; Kohji Kamejima, Kokubunji, and Minoru Kano, Higashimurayama, all of Japan, assignors to Hitachi, Ltd., Japan**

**Filed May 28, 1975, Ser. No. 581,710**
**Claims priority, application Japan, May 29, 1974, 49-59689**
**Int. Cl.² G05D 23/24**
**U.S. Cl. 62—176 E** **16 Claims**




1. A system for controlling an air conditioner comprising first means for detecting the radiation temperature in a controlled space and providing an output indicative thereof, second means for setting a desired air parameter value in response at least to the output of said first means corresponding to the detected radiation temperature and providing an output

indicative of the set air parameter, and a third means for controlling said air conditioner in accordance with the set air parameter from said second means, and further comprising fourth means for detecting the actual air parameter in the controlled space and providing an output indicative thereof, and fifth means for comparing the set air parameter from said second means with the actual air parameter from said fourth means and providing an output signal to the difference therebetween, said third means being responsive to the difference signal from said fifth means for controlling said air conditioner in accordance therewith.

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## 4,024,726

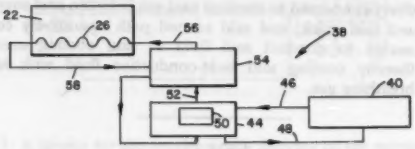
## SOLAR HEAT TRAP FOR BUILDING WINDOWS

**Ronald T. Furner, Birrong, Australia, assignor to Enercon West, Belmont, Calif.**

**Filed Apr. 11, 1975, Ser. No. 567,444**

**Int. Cl.² F25B** *27/00*; **F25D** *23/12*; **E06B** *7/12*

**U.S. Cl. 62—2** **7 Claims**




1. An air conditioned building comprising:
an exterior wall;
at least one floor and at least one ceiling vertically spaced from the floor to define a building interior;
the wall including at least one opening defining a window positioned to permit sunlight to enter the building interior;
first and second, horizontally spaced, sunlight transmission window panes in the wall opening and defining an upright window space between each other;
means sealing the window space from the building exterior and the building interior;
a heat absorbing liquid filling the window space, whereby sunlight passing through the building window is cooled before it enters the building interior and correspondingly heats the liquid;
a heat exchanger in the space in contact with the liquid;
an actuatable absorption refrigeration system operatively coupled to the heat exchanger for directing a coolant therethrough and for thereby directing the coolant in heat exchange relationship to the liquid; and
means responsive to the presence or absence of sunlight and positioned to absorb heat energy from the sunlight entering the window for actuating or deactuating, respectively, the absorption refrigeration system.

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## 4,024,727

## VUILLEUMIER REFRIGERATOR WITH SEPARATE PNEUMATICALLY OPERATED COLD DISPLACER

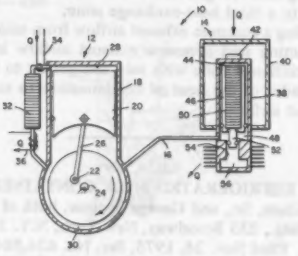
**Robert L. Berry, Palos Verdes Peninsula, and Axel G. Dehne, Los Angeles, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.**

**Filed Mar. 1, 1974, Ser. No. 447,417**

**Int. Cl. F25b** *9/00*

**U.S. Cl. 62—6** **3 Claims**

1. A cryogenic refrigerator comprising;
a cold cylinder having a cold end and having a cold cylinder area, a displacer reciprocably mounted within said cold cylinder and separating said cold cylinder into a cold volume at the cold end of said cold cylinder and a warm volume at the other end thereof, said displacer having a smaller area at said warm volume than said cold volume, a regenerator connected between said warm volume and said cold volume and a pneumatic spring for urging said cold displacer toward both the cold and the warm ends of said cold cylinder, said displacer being freely reciprocable in said cold cylinder except for said pneumatic spring and pressure in said cold and warm volumes acting on the differential area of said displacer facing said cold volume and said warm volume, the improvement comprising:
a thermal pulse generator connected to said warm volume of said cold cylinder for providing pressure pulses for causing reciprocation of said cold displacer in said cold cylinder, said thermal pulse generator comprising:
a hot cylinder having a hot end and a warm end, a displacer reciprocapably mounted in said hot cylinder for separating said hot cylinder into a hot volume and a warm volume, said warm volume of said thermal pulse generator being connected to said warm volume of said cold cylinder, a regenerator connected between said hot volume and said warm volume and means for heating the hot end of said hot cylinder, refrigerant gas in said volumes, said refrigerant gas increasing in pressure in all of said volumes as said hot displacer displaces refrigerant gas into said hot volume and decreasing in pressure as said hot displacer displaces gas out of said hot volume into said warm volume.

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## 4,024,728

## METHOD OF AND AN INSTALLATION FOR CONTROLLING THE TEMPERATURE OF A PLURALITY OF ROOMS HAVING MUTUALLY DIFFERING AND VARYING HEATING REQUIREMENTS, AMONGST WHICH ROOMS THERE IS NORMALLY A COOLING REQUIREMENT

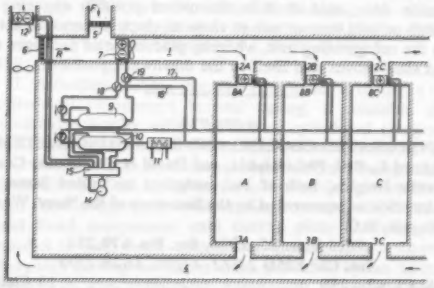
**Berth Ulrik Gustafsson, Osterskar, Sweden, assignor to Projectus Industriprodukter AB, Stockholm, Sweden**

**Filed Jan. 20, 1976, Ser. No. 650,731**

**Claims priority, application Sweden, Feb. 18, 1975, 75018077**

**Int. Cl.² F25B** *7/00*, *27/02*, *13/00*

**U.S. Cl. 62—79** **6 Claims**




1. A method for regulating the temperature of a plurality of rooms having mutually differing and varying heating requirements, among which rooms there is normally a cooling requirement, said method comprising:
a. providing a common input airflow for said rooms;

b. contacting said common input airflow with a cyclically evaporated, compressed, and condensed refrigerant in a first heat-exchange zone to transfer a portion of the heat of condensation of the refrigerant to said common input airflow to impart to said common input airflow a heat content corresponding to the requirement of that room having the lowest heat requirement per supplied unit volume of air;

c. dividing said common input airflow into individual air flows to the respective room;

d. contacting each of said individual airflows in separate second heat-exchange zones with said refrigerant to transfer further portions of the heat of condensation of said refrigerant to afterheat, each of said individual airflows to the extent required for the respective rooms;

e. flowing said refrigerant from said second heat-exchange zones to a third heat-exchange zone;

f. providing a common exhaust airflow from said rooms; and

g. contacting said common exhaust airflow in said third heat-exchange zone with said refrigerant to transfer the remainder of the heat of condensation to said common exhaust airflow.

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**4,024,729**

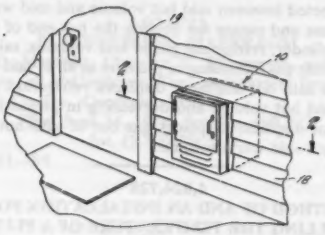
**REFRIGERATED MILK CONTAINER**

**Rudolph Abate, Sr., and George Spector, both of 3615 Woolworth Bldg., 233 Broadway, New York, N.Y. 10007**

**Filed Nov. 24, 1975, Ser. No. 634,584**

**Int. Cl.² F25D** *23/12*; **A47B** *81/00*; **E05B** *65/46*; **E05C** *13/04*

**U.S. Cl. 62—263** **4 Claims**



1. The combination of a refrigerated box and a wall comprising a box with a refrigerating unit mounted under the bottom side of said box, said box being mounted in an opening in said wall, said box having a hinged outside door at one end and a hinged inside door at an opposite end, including a shelf mounted inside said box vertically movable relative to said bottom side, said shelf having a downward hook engagable with an upward hook of said outside door when said shelf is moved downwardly against a compression spring to lock the outside door, said shelf in downward position engaging a switch on said bottom side to close an electric circuit to actuate the refrigerating unit, whereby placement of packages on said shelf moves said shelf to the downward position.

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**4,024,730**

**INTEGRATED COOLING AND BREATHING SYSTEM**

**Richard L. Bell, Philadelphia, and David N. DeSimone, Cornwells Heights, both of Pa., assignors to United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Mar. 25, 1976, Ser. No. 670,281**

**Int. Cl.² F25D** *23/12*, *11/00*; **A62B** *7/00*

**U.S. Cl. 62—259** **10 Claims**

1. an integrated liquid loop cooling and breathing system for a subject, comprising:

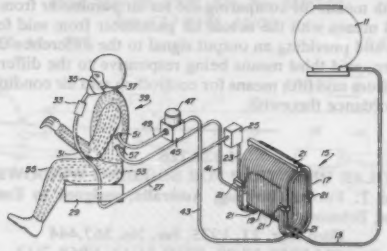
a supply of a liquified breathing gas;

a heat-conductive fluid;

a breathing gas mask formed to be worn by the subject;

cooling means formed to be worn by the subject for circulating said heat-conductive fluid therethrough; and

a heat exchanger having first and second flow paths in heat transfer relationship to each other, said first path operatively connected to conduct said gas between said supply and said mask, and said second path operatively connected to conduct said fluid to said cooling means thereby cooling said heat-conductive fluid with said breathing gas.



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**4,024,731**

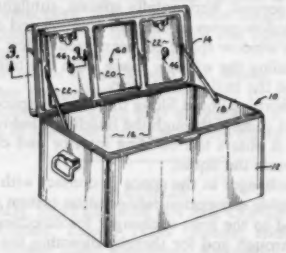
**INSULATED CONTAINER WITH REFREEZABLE LID-MOUNTED BOTTLE**

**Tony E. Branscum, Winfield, Kans., assignor to Gott Mfg. Co., Inc., Winfield, Kans.**

**Filed Oct. 31, 1975, Ser. No. 627,754**

**Int. Cl.² F25D** *3/08*; **B65D** *23/00*, *25/00*, *7/42*

**U.S. Cl. 62—457** **11 Claims**



1. Structure for presenting a cold storage area, said structure comprising:

an open top body portion defining said area;

a lid portion adapted to be received by said body portion to close said open top,

said lid presenting an open cavity on the side of the lid facing said area,

means for presenting an enclosure having spaced apart flexible sidewalls and adapted to receive a freezable liquid,

said enclosure presenting means being adapted to be received in said cavity,

means for defining a passageway through said sidewalls and a portion of said enclosure;

a locking member received in said passageway; and

means on said locking member for cooperating with the passageway defining means to prevent removal of said locking member from said passageway;

means on said lid portion for cooperating with said locking member to releasably lock said enclosure presenting means to said lid portion,

said locking member being accessible upon opening of said lid whereby a user of said structure may operate said

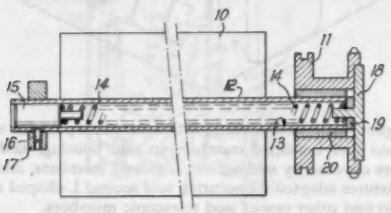
member to release said enclosure presenting means for insertion of the latter into a freezer compartment.

4,024,732

## DEVICE FOR THE MECHANICAL FILTERING OF THE MOVEMENT TRANSMITTED BY A STEP MOTOR

Pierre-Regis Marie Irissou, Meudon, France, assignor to Advanced Technology Applications Corporation (ATAC), Meudon, France

Filed Nov. 6, 1975, Ser. No. 629,468
Claims priority, application France, Aug. 11, 1974, 74.37169
Int. Cl. F16d 3/14
U.S. Cl. 64—27 CT 4 Claims




1. A device for the mechanically filtering of the movement transmitted by a step motor to a member to be driven in rotation, comprising:

a resilient tension element in the form of a coil spring arranged axially in an axial bore of a driving shaft rotated by the motor, said spring having one end rigid with the shaft and the other end rigid with the member to be driven which is substantially coaxial with said shaft; and

a damping member coaxial with and rigid with the member to be driven and having a radial surface engageable in frictional contact with a radial end surface of the shaft;

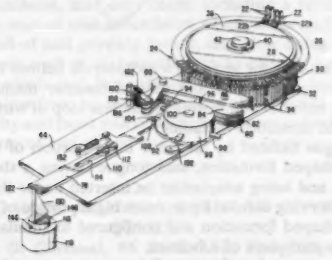
the coil spring being axially pre-stressed to urge the said damping member into frictional contact with the shaft.

4,024,733

## MULTIPLE PATTERN WHEEL

Lester Mishcon, and Harry Agulnek, both of Miami Beach, Fla., assignors to The Singer Company, New York, N.Y.

Filed Feb. 20, 1976, Ser. No. 659,861
Int. Cl.² D04B 15/76
U.S. Cl. 66—50 A 5 Claims



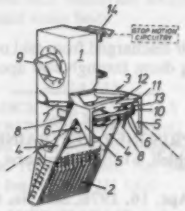
1. In a circular knitting machine the combination comprising a cam section block, needle actuating cams on the section block, a slotted pattern wheel, a plate affixed to the section block and having the pattern wheel rotatably mounted thereon above said cams, needles having an upper butt which enter the pattern wheel slots and drive the wheel and having a lower butt which engage said cams, jacks in the pattern wheel slots movable between a needle actuating and a non-actuating position, the jacks including a set of butts at each of a plurality of different levels and the butts of each set being on selected jacks only, means operable to preposition the jacks during rotation of the wheel, and an actuator for each set of butts mounted on said plate for movement relative to the pattern wheel and operable to change the positions of the jacks on which such butts are located prior to needles entering the slots wherein such jacks are located.

4,024,734

## YARN FAULT DETECTORS

Kenneth Albert Jordan, Oadby, England, assignor to Trip-Lite Ltd., Leicester, Great Britain

Filed Aug. 15, 1975, Ser. No. 605,368
Claims priority, application United Kingdom, Oct. 9, 1974, 43652/74; Oct. 9, 1974, 43653/74
Int. Cl.² B65H 63/02; D04B 35/18
U.S. Cl. 66—158 13 Claims




1. A yarn fault detector for textile machinery that is provided with stopmotion circuitry, comprising

a housing,

detector wire means pivotally mounted on said housing and movable under gravity between a raised position supportable by a yarn in normal use, and a lower position effective to actuate the stopmotion circuitry on the textile machinery,

a pivotal guide frame pivotally mounted on said housing and movable over center between an opertive yarn guiding position and a yarn releasing position,

means within said housing biasing said guide frame to its yarn guiding or releasing positions,

a pair of yarn guides on said guide frame,

a fixed guard frame having side guards, one at each side of said pair of yarn guides, extending from said guide frame for further guiding yarn through the detector, and

a freely pivotable stop bar on said fixed guard frame for contacting both of said yarn guides when said guide frame is in its operative position.

4,024,735

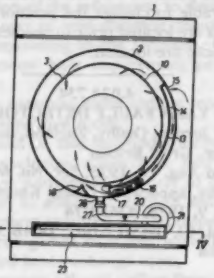
## WASHING MACHINE

Sergio Marchiselli, Barcelona, Spain, assignor to Zallas Establishment, Eschen, Liechtenstein

Filed Nov. 28, 1975, Ser. No. 636,145
Claims priority, application Spain, Nov. 30, 1974, 432739
Int. Cl.² D06F 21/04, 39/04, 25/00
U.S. Cl. 68—16 9 Claims

1. A clothes-washing machine comprising a casing, a fixed cylindrical component in said casing, a rotatable drum mounted coaxially within said fixed cylindrical component and forming a space therewith, said rotatable drum having a wall with apertures therein, said rotatable drum being adapted to receive clothes to be washed, a curved plate secured to said fixed component in the space between said drum and said fixed component, said curved plate extending non-parallel to said fixed component and defining a chamber therewith having an upper inlet provided by an aperture formed in the cylindrical component for admission of air thereinto and a lower outlet which opens into the space between the drum and the fixed component, a set of heating resistors located in said chamber proximate said lower outlet, and a prism-shaped piece of triangular section forming a deflector mounted on said fixed

component in the space between said drum and said fixed component and opposite and adjacent said outlet of the chamber for diverting air discharged from said outlet so that said air enters the rotating drum through said apertures in its wall.



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**4,024,736**

**PRISONER RESTRAINER**

**William P. De Michieli, 6148 Brokenhurst Road, Indianapolis, Ind. 46220**

**Filed Apr. 16, 1976, Ser. No. 677,763**
**Int. Cl.² E05B *73/00***
**U.S. Cl. 70—16** **5 Claims**

1. A prisoner restrainer comprising:
first and second ankle cuff members;
a strap winding apparatus connected to one of said members;
a strap connected to said winding apparatus and to the other of said members;
and means in said winding apparatus to limit the rate of unwinding of said strap therefrom.

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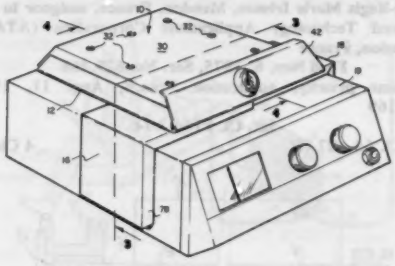
**4,024,737**

**LOCKABLE MOUNTING MEANS FOR REMOVEABLY SUPPORTING ELECTRONIC ACCESSORIES IN VEHICLES**

**Carol Edward McInturff, P.O. Box 3576, Tempe, Ariz. 85257**

**Filed June 14, 1976, Ser. No. 695,523**
**Int. Cl.² E05B *73/00***
**U.S. Cl. 70—58** **12 Claims**

1. A lockable mounting means for removeably supporting electronic accessories in vehicles comprising: a pair of telescopic members; one of said members slideably moveable within the other along a first axis; key operated locking means disposed to removeably lock and hold said members one within the other; one of said members adapted to be fixed in a vehicle; the other of said telescopic members being a removeably support for an electronic accessory; connector means for connecting said accessory to said other member; said connector means having a pair of first L-shaped members adapted to be secured contiguously around a corner of a generally rectangular accessory housing, such that said first L-shaped members are generally opposed to each other and disposed around opposite corners of said housing; a pair of second L-shaped members; hinge means coupling each one of said second L-shaped members to each of said first L-shaped members such as to nest therewith at an opposite side thereof with respect to the side of said first L-shaped member which is contiguous with said housing; first fixtures adapted for securing said first L-shaped members to said housing; said first fixtures covered by said second L-shaped members; and second fixtures adapted for securing said second L-shaped members to said other one of said telescopic members.



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**4,024,738**

**FASTENER FOR MOTORCYCLE DRIVER'S HELMET**

**Ching-Tien Pi, No. 34, Lane 98, Tung Hua St., Taipei, China /Taiwan**

**Filed Oct. 7, 1975, Ser. No. 620,365**
**Int. Cl.³ E05B *69/00***
**U.S. Cl. 70—59** **6 Claims**

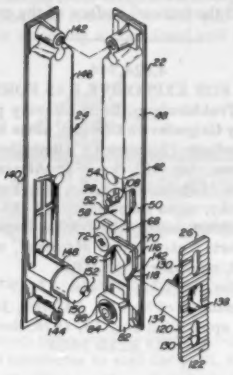
1. A fastener for securing a motorcycle helmet to a motorcycle, comprising first and second fastener members, each fastener member comprising an endless loop of wire of hollow U-shaped formation including:
a tongue defined by an inner bight portion of the hollow U-shaped formation, said tongue having a short curved arc and being adapted to be inserted under the helmet;
an outer ring defined by an outer bight portion of the hollow U-shaped formation and configured to simulate the outside curvature of a helmet;
an ear secured to the top of the outer ring, said ear having a hole therein for receiving a lock;
a pair of flat sections defined by outer ends of leg portions of the hollow U-shaped formation, said flat sections being configured to receive a rim of the helmet;
said fastener members being insertable around front and lower portions of a helmet, with the flat sections of one member engaging the front rim of the helmet and the flat portions of the other member engaging the lower rim of the helmet, and with the openings in said ears being substantially aligned for receiving a lock.

**4,024,739**

## SLIDING GLASS DOOR LOCK

**Nathan Kaufman, 5212 Cleveland St., Hollywood, Fla. 33021**

**Filed Feb. 13, 1976, Ser. No. 657,899**
**Int. Cl.² E05B** *65/08*
**U.S. Cl. 70—97** **6 Claims**



1. A lock for a sliding door comprising a vertically oriented elongated escutcheon having front and rear walls and having a slidable latching means for movement between an "open" and a "locked" position, said escutcheon including means for releasably retaining said latching means in both of said positions, said slideable latching means including a latching bar and a latch secured thereto to lock the sliding door, said latching bar including an elongated slot of a first width having at least one enlarged portion of a second width and a locking mechanism having a bolt which extends through said slot and is rotatably secured to said escutcheon, the portions of said bolt extending through said slot having an irregular periphery so that facing in one direction the thickness of said bolt is greater than the width of said portion of said slot of said first width, and when said bolt faces in a position rotated a predetermined angular amount from said position facing in said one direction, the thickness of said bolt is less than the width of said slot of said first width, said latching bar being disposed in a channel provided in the rear of said escutcheon with said bar being secured at both ends against lateral movement with respect to the escutcheon, said bar being mounted below a gripping means provided in said escutcheon, said gripping means comprising a recess in the upper end of the front wall of said escutcheon, said escutcheon including a rectangular plate in the rear of said escutcheon which is secured to the rearmost wall of said gripping means, said plate being spaced from the front wall of said escutcheon to provide a narrow channel in which said bar extends whereby said bar is restrained against front to rear movement with respect to said escutcheon by said front wall of said escutcheon and said plate at the uppermost end of said bar.

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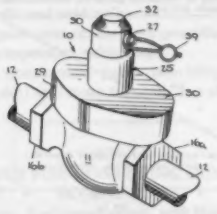
**4,024,740**

## LOCKING HOOD ASSEMBLY FOR FLOW CONTROL DEVICE

**Bernard A. Di Giovanni, 96 Davis Ave., Hauppauge, N.Y. 11787**

**Filed May 10, 1976, Ser. No. 684,573**
**Int. Cl.² G05G** *5/00;* **F16K** *19/00, 35/06*
**U.S. Cl. 70—175** **18 Claims**

1. A flow control device having a fixed portion and an operating member which is movable with respect to said fixed portion; a locking hood assembly mounted on said flow control device for preventing said movement of its said operating member, said locking hood assembly comprising a main body having an interior configuration fitting on and substantially surrounding said operating member; and releasable means retaining said main body in its said fitting relation with respect to said operating member; said locking hood assembly further comprising a removable cover cap on said main body covering



and thereby preventing access to said releasable retaining means, and removable lock means for locking said cover cap in said position on said main body.

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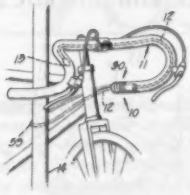
**4,024,741**

## COMBINATION LOCK PERMANENTLY INSTALLABLE BY SELF-GRIPPING MOUNTING MEANS

**Dennis Arblaster, 34081 La Serena, Dana Point, Calif. 92629**

**Filed Feb. 10, 1975, Ser. No. 548,592**
**Int. Cl.² B62H** *5/00*
**U.S. Cl. 70—233** **8 Claims**



1. A locking device permanently securable to one end of a cycle handle bar and adapted to lock the cycle to a fixed object when not in use comprising, an elongated tubular main body having generally radially disposed strong but flexible protrusions projecting therefrom and having a sharp edge extending transversely of their free outer ends, said protrusions being sized to have a forced telescopic fit with the interior wall of a handle bar upon insertion axially therealong with said sharp edges biting into said wall to positively prevent withdrawal of said lock device, combination lock mechanism on the outer end of said lock device including a locking bolt lockable within the outer end of said main body when either end thereof is inserted into the outer end of said tubular main body, flexible tie means slidably supported axially of said tubular main body and normally storable within a cycle handle bar when not in use, means preventing full withdrawal of said tie means from said lock device, the outer end of said tie means being anchored to said locking bolt, and a seating groove for said tie means along one side of said locking bolt to seat a length of said tie means when said tie means is in use to lock a cycle to a fixed object.

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**4,024,742**

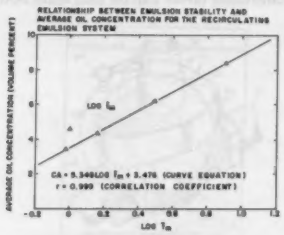
## METHOD OF LUBRICATING A COLD REDUCTION MILL

**Michael G. Vucich, Weirton, W. Va., and Michael X. Vitellas, Steubenville, Ohio, assignors to National Steel Corporation, Pittsburgh, Pa.**

**Filed Sept. 22, 1975, Ser. No. 615,692**
**Int. Cl.² B21B** *27/10, 45/02*
**U.S. Cl. 72—42** **5 Claims**

1. A method of controlling the operation of a steel strip rolling mill comprising charging the mill with an oil-in-water emulsion lubricant, testing the stability of the emulsion as

determined by a progression of emulsion stability index values treating the emulsion to maintain its stability within a prese-


RELATIONSHIP BETWEEN EMULSION STABILITY AND AVERAGE OIL CONCENTRATION FOR THE RECIRCULATING EMULSION SYSTEM
AVERAGE OIL CONCENTRATION (VOLUME PERCENT)
LOG $I_m$
CA = 5.340LOG $I_m$ + 3.476 (CURVE EQUATION)
r = 0.999 (CORRELATION COEFFICIENT)
LOG $I_m$

lected range of said index values and correlating the oil concentration in the emulsion with said range of index values.

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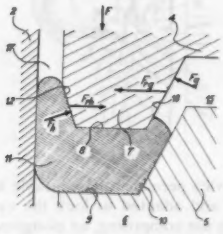
4,024,743

## SEALING DEVICE FOR AN EXTRUSION PRESS OR A COMPACTING PRESS

**Jacques Decours, Arpajon, and Jean Gavinet, Orsay, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France**

**Filed Oct. 1, 1975, Ser. No. 618,575**
**Claims priority, application France, Oct. 8, 1974, 74.33851**
**Int. Cl.² B21D *22/10*; B21C *25/00***
**U.S. Cl. 72—54** **15 Claims**



1. A sealing device for a ram operated extrusion or compacting press having a press chamber, comprising:

first and second members slidably mounted in an opening of the press chamber and serving to close the press chamber, said members being in interengaged relation and having a clearance space therebetween along a common axis, at least one of said members being subjected to the action of the ram;

a plastically deformable seal located between said first and second members in the vicinity of their periphery;

said first and second members being responsive to the action of the ram which exerts a compressive force on said members along the common axis thereof so as to compress within the press chamber an element which is maintained under hydrostatic pressure of a liquid medium or a lubricant, one of said first and second members being in contact with the liquid medium or lubricant;

one of said first and second members being provided with a substantially flat bearing surface of small cross-sectional area, relatively to the overall cross-sectional area of the member, which is applied against the seal and which extends at right angles to the common axis, the other of said first and second members being provided with an inclined bearing face applied against the seal and directed towards the exterior of said other member, the application of said compressive force to said members under the action of the ram being such as to cause initial creep deformation of the seal under pressure; and

the member in contact with said liquid medium or lubricant under hydrostatic pressure within the press chamber comprising means for establishing pressure equilibrium within the press chamber and for also establishing pressure equilibrium within the clearance space formed between said first and second members and the seal, said pressure equilibrium establishing means establishing said pressure equilibrium only immediatly after deformation of the seal so as to ensure pressure-tightness between said members and the internal surface of the press chamber.

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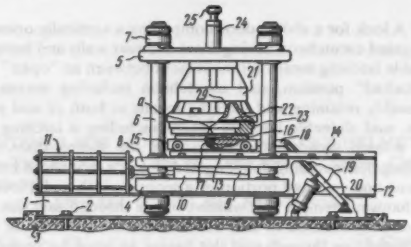
4,024,744

## DEVICE FOR EXPLOSIVE GAS FORMING

**Jury Borisovich Trakhtenberg, Brest-Litovsky prospekt, 162-a, kv. 29; Vasily Grigorievich Oleshko, ulitsa Kreschatik, 21, kv. 106; Vladimir Ivanovich Klimentiev, Novo-Gostomelskoe shosse, 16 "d", kv. 53; Alexandr Iosifovich Zapunny, ulitsa Miljutenko, 10, kv. 23; Yaroslav Nikolaevich Robakovsky, ulitsa Belorusskaya, 1, kv. 29; Vladimir Petrovich Rossikhin, ulitsa Akademika Tupoleva, 16 "d", kv. 53, and Boris Yakovelevich Maximuk, ulitsa Fabrichnaya, 2, kv. 60, all of Kiev, U.S.S.R.**

**Continuation of Ser. No. 632,777, Dec. 17, 1975, abandoned, which is a continuation of Ser. No. 542,700, Jan. 21, 1975, abandoned. This application July 19, 1976, Ser. No. 706,907**
**Int. Cl.² B21D *26/08***
**U.S. Cl. 72—56** **7 Claims**



1. A device for explosive gas-forming, comprising: a first plate; a second plate located parallel to said first plate and connected thereto; a die for supporting a blank, said die being mounted on said first plate; an explosion chamber having a pair of sides one of which is adjacent to said die, said explosion chamber being fixed on said second plate; a detonation tube connected to the opposite side of said explosion chamber; a gas mixture igniter mounted in said detonation tube; means for connecting said explosion chamber to a gas mixture source; a part shaped as a body of revolution set in said explosion chamber defining an annular space formed between the external surface of said part and internal side surface of said explosion chamber; said annular space being filled with a gas mixture; the cross-sectional area of said annular space in the chamber cross-section being varied in the direction of propagation of the detonation wave front so as to preserve detonation conditions of the gas mixture burning in said explosion chamber.

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4,024,745

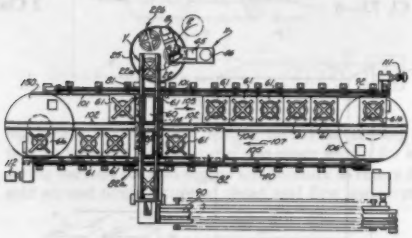
## ROD COOLING AND COILING SYSTEM

**Walter Johann Karlberger, Smedjebacken, Sweden, assignor to Morgardshammar Aktiebolag, Smedjebacken, Sweden**

**Filed Jan. 27, 1975, Ser. No. 544,180**
**Int. Cl.² B21B *45/02*; B21F *21/00*; C21D *1/62***
**U.S. Cl. 72—201** **15 Claims**

1. A rod cooling and coiling system for cooling and coiling rod as it exits from a rod rolling stand, said system comprising a coiler, a guide section for guiding the rod to the coiler, an indexible support having a plurality of coil receiving supports, means for indexing said support to locate said coil receiving supports alternatively beneath said coiler for receiving coiled

rod, means for removing a completed coil from one of said coil receiving supports while said coiler is forming coils on another of said coil receiving supports, a plurality of cars which are selectively positionable in a coil receiving location for receiving said completed coils from said coil removing means, means for moving said cars through a car path in which the cars are carried from the coil receiving station to a coil removing station and returned to said coil receiving station, said means for removing a completed coil comprising a first



lifting mechanism supported for linear movement along a first path disposed transverse to said car path, a bundling mechanism associated with a portion of said car path disposed upstream of said coil removal station for bundling a coil prior to its removal from said coil removal station means at said coil removal station for removing a coil from a car comprising a second lifting mechanism supported for linear movement along a second path disposed transverse to said car path said first and second paths being in substantial alignment and extending across said car path.

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**4,024,746**

## STAND GEARING ARRANGEMENT FOR THE ROLLS OF A CONTINUOUS ROLLING MILL

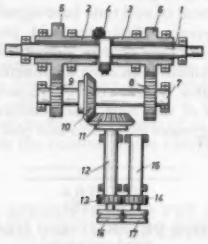
**Josef Brück, Duisburg, Germany, assignor to Demag Aktiengesellschaft, Germany**

**Filed Jan. 27, 1976, Ser. No. 652,875**

**Claims priority, application Germany, Jan. 28, 1975, 2503325**

**Int. Cl.² B21B *35/02***

**U.S. Cl. 72—249** **3 Claims**



1. A transmission arrangement for the rollers of the individual stands in a continuous rolling mill line, particularly for wire manufacturing in which the gears of each stand in the line are graduated according to the desired degree of elongation required of the wire rod, said transmission arrangement comprising

a. a common transmission drive shaft connected to a power source;

b. a plurality of stands in the line with each connected to said common transmission drive shaft;

c. a set of opposed wire engaging rolls in each stand connected to said common transmission drive shaft by a stand gearing arrangement; the improvement characterized by

d. each stand gearing arrangement including selectively at least two gear connection paths between said main transmission shaft and said rolls;

e. each said gear connection path providing a fixed connection to its respective rolls; and

f. said gear connection paths providing different speed ratios between said main transmission shaft and said rolls.

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**4,024,747**

## APPARATUS FOR CONVEYING PUNCHED-OUT COMPONENTS

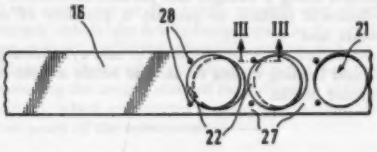
**Ewald Bergmann, Rechberghausen, and Horst Pfisterer, Goppingen, both of Germany, assignors to L. Schuler GmbH, Germany**

**Filed Aug. 5, 1976, Ser. No. 711,974**

**Claims priority, application Germany, Aug. 28, 1975, 2538239**

**Int. Cl.² B21D *31/02***

**U.S. Cl. 72—325** **9 Claims**




1. In an apparatus for conveying components punched out from a strip of material with the resulting formation of a punched grid from the working area of a press, wherein a feeding mechanism for conveying the strip of material into the working area of the press is provided, and wherein at least one controllable ejector is arranged in an upper die of said press for ejecting punched-out components onto conveying means during the return stroke of the upper die,

the improvement wherein said apparatus further includes

means for punching out lugs from said strip of material rearwardly of each punched out component with respect to the direction of travel of said strip of material, and wherein

said strip is utilized as said conveying means for said punched out components, with said lugs serving to retain said components on said strip during the travel thereof.

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**4,024,748**

## APPARATUS FOR PRODUCING ANNULAR METALLIC BLANKS FOR METALLIC RINGS

**Kazuyoshi Yashiro, Kure, Japan, assignor to Bendo Kogyo Co., Ltd. and Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, both of, Japan**

**Filed Nov. 4, 1975, Ser. No. 628,735**

**Claims priority, application Japan, Mar. 11, 1975, 50-29353; Sept. 11, 1975, 50-110428**

**Int. Cl.² B21D *11/06***

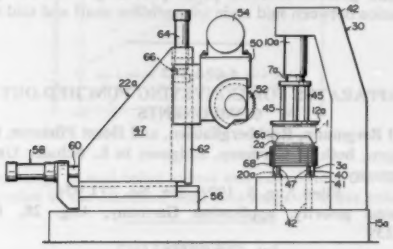
**U.S. Cl. 72—391** **8 Claims**

1. An apparatus for producing metallic annular blanks for rings having a predetermined inner diameter from a preformed metallic spiral member which has an inner diameter smaller than said predetermined inner diameter of said rings, said apparatus comprising:

a holding means having a cylindrical portion with an outer diameter greater than said predetermined inner diameter of said rings and a frusto-conical portion provided on one end of said cylindrical portion, the diameter of the tip portion of the frusto-conical portion being smaller than said inner diameter of said spiral member;

means for forcibly applying said spiral member about said

cylindrical portion of said holding means, said applying means including a substantially annular pusher member having an inner diameter slightly greater than the outer diameter of said cylindrical portion, said pusher member being drivable along the axis of said cylindrical portion so as to push said spiral member placed on said frusto-conical portion onto said cylindrical portion;



means for cutting said spiral member on said cylindrical portion along a straight line parallel to the axis of said cylindrical portion to provide a plurality of metallic bends; and

means for removing said bends from said cylindrical portion of said holding means to use the bends as said metallic annular blanks.

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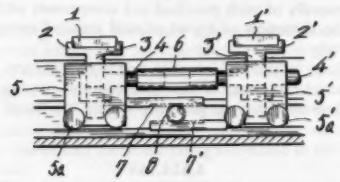
**4,024,749**

## THREE-DIMENSIONAL WORK FEED DEVICE IN A TRANSFER PRESS

**Naonori Taniguchi, and Shozo Imanishi, both of Sagamihara, Japan, assignors to Aida Engineering Ltd., Sagamihara, Japan**

**Filed July 14, 1976, Ser. No. 705,015**
**Claims priority, application Japan, July 22, 1975, 50-88897**
**Int. Cl.² B21D *43/02***
**U.S. Cl. 72—421** **4 Claims**



1. In a three-dimensional feed device in a transfer press for feeding work by successive clamping, lifting, advance, descending, unclamping and return movements of a pair of feed bars, characterized in that guide plates are integrally formed with a feed bar guide and having a through axial bore consisting of a circular arc portion and a linear portion, crank shafts each having an eccentric portion loosely extending through a respective one of said axial bores, a drive shaft fixedly connected to one of said crank shafts and rotatably supported in a slide block slidably supported in a stationary casing, an internal sun gear fixedly secured to said stationary casing, a planetary gear having a tooth number ratio of 1 : 4 with respect to said sun gear and rotatably journalled in a rotary support member for rotational movement in a coaxial relationship to said sun gear in response to the upward and downward movement of the slide of said press, said planetary gear having an eccentric pin, a slidable rack slidably received in said block at right angles to the slidable movement direction of the slide block within said stationary casing and a pinion secured to said drive shaft in operative engagement with said eccentric pin.

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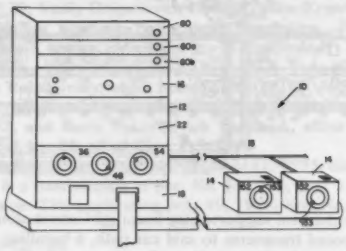
**4,024,750**

## FREQUENCY TUNING SYSTEM WITH VISUAL DISPLAY

**Bruce G. Erickson, Santa Clara, Calif., assignor to American Micro-systems, Inc., Santa Clara, Calif.**

**Filed May 19, 1975, Ser. No. 578,606**
**Int. Cl.² G04D *7/12*; G01R *23/12***
**U.S. Cl. 73—6** **2 Claims**



1. A visual tuning aid system for aligning a time base signal generator in an electronic time piece to a correct frequency including:

reference signal generator means for generating a reference signal at a frequency integrally related to said correct frequency;

sensor means for sensing and selectively amplifying a time base signal generated by the time base signal generator in a said electronic time piece to be aligned;

phase change indicator means connected to said reference signal generator and to said sensor means for indicating by a relative movement the rate of phase change between said reference signal and said time base signal;

plus signal generator means for generating a plus signal having a frequency a predetermined small amount above said reference signal;

minus signal generator means for generating a minus signal having a frequency a predetermined small amount below said reference signal; and

switch means connected to said phase change indicator means for selecting one of said reference signal, plus signal and minus signal,

whereby alignment of said time base signal generator to said correct frequency eliminates said phase change, and thereupon said phase change indicator means ceases said relative movement indicating alignment of said time base signal generator to said correct frequency, and whereby tuning range of said time base generator may be ascertained by alignment thereof to said plus signal and to said minus signal.

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**4,024,751**

## APPARATUS FOR DETERMINING HEAT TRANSFER EFFICIENCY

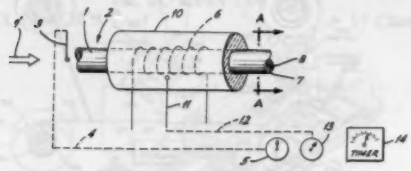
**Anthony C. Potrzebowski, Hatboro, Pa., assignor to Betz Laboratories, Inc., Trevose, Pa.**

**Filed Dec. 18, 1975, Ser. No. 641,793**
**Int. Cl.² G01N *25/00***
**U.S. Cl. 73—15 R** **18 Claims**

1. Apparatus for determining the heat transfer efficiency of a heat exchanger wall having at least a first heat transfer surface exposed to heat exchange fluid and a second heat transfer surface, said apparatus comprising:

heating means located with respect to said second heat transfer surface for heating the second surface from a first temperature to a second predetermined temperature, and heat dissipation determining means associated with said

heat exchanger wall for determining the rate of dissipation of a heat load across said heat exchanger wall and into said heat exchange fluid, wherein said heat dissipation determining means comprises first temperature sens-



ing means adjacent said heating means for sensing said first and second temperatures and timer means for measuring the time for said sensed temperature to return from said second temperature to about said first temperature.

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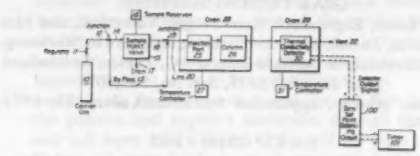
## 4,024,752

## METHOD AND APPARATUS FOR SIMPLE FIELD TEST TO DETERMINE FINAL BOILING POINT OF A VOLATILE LIQUID SAMPLE

**Matthew R. Orlando, Princeton, N.J., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed July 12, 1976, Ser. No. 704,862**
**Int. Cl.² G01N** *25/08, 31/08*
**U.S. Cl. 73—17 A** **10 Claims**



1. An apparatus for measuring the retention time of a volatile liquid sample in a chromatographic column which comprises:

a. a chromatograph of such resolution that the detector output signal exceeds a set point, hereinafter defined, during the elution of at least 98% of said sample from the column;

b. a timer; and

c. means for energizing the timer during the period in which the detector output signal exceeds the set point,

said set point being greater than signals resulting from instrument and line noise, and less than the detector output signal during the elution of at least 98% of the sample from the column of the chromatograph.

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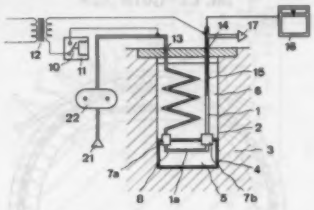
## 4,024,753

## METHOD AND APPARATUS FOR THE CONTINUOUS AUTOMATIC ANALYSIS OF THE CRYSTALLIZATION POINT OF LIQUID SUBSTANCES

**Paul Ouvrard, Saint Nazaire, France, assignor to Societe Anonyme dite: Antar Petroles de l'Atlantique, Paris, France**

**Continuation-in-part of Ser. No. 505,645, Sept. 13, 1974, Pat. No. 3,945,243. This application Mar. 11, 1976, Ser. No. 665,967**
**Claims priority, application France, Mar. 21, 1975, 75.08934**
**Int. Cl.² G01N** *25/04*
**U.S. Cl. 73—17 R** **5 Claims**

1. Method for the continuous automatic analysis of the crystallization point of liquid substances, comprising passing the substance to be analysed through a measuring circuit at a constant flow rate, the temperature therein being maintained at a value sufficiently below the assumed crystallization point of the substance, heating means being provided along the flow path of the liquid substance in said circuit, maintaining the substance in the course of cooling in contact with an isomorphous crystalline material, automatically turning on and off said heating means respectively at two characteristic temperatures, detected by measuring the pressure drop or difference of pressure of the substance at the inlet and at the outlet of the measuring circuit, variations of the pressure drop being ef-



fected as a function of temperature, the values thus measured of the pressure drop being utilized as control data for respectively turning on and off the heating means when the temperature of the substance at the outlet reaches one of its two characteristic values, the first corresponding to the crystalline temperature level, whilst the other corresponds to a temperature sufficiently above said crystallization point, and continuously recording the temperature of the substance at the outlet of the circuit, which constitutes a value representing the crysallization point of the substance.

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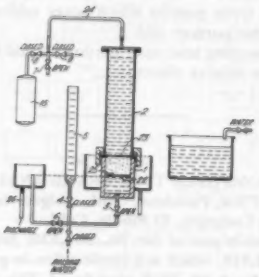
## 4,024,754

## METHOD AND APPARATUS FOR DETERMINATION OF DRAINABILITY OF MATERIAL IN SUSPENSION AND/OR STOCK FORM

**Georg V. Alfthan, Helsinki, Finland, assignor to Oy Keskuslaboratorio-Centrallaboratorium AB, Helsinki, Finland**

**Filed Mar. 18, 1976, Ser. No. 668,328**
**Claims priority, application Finland, Mar. 26, 1975, 750931**
**Int. Cl.² G01N** *33/34*
**U.S. Cl. 73—63** **5 Claims**



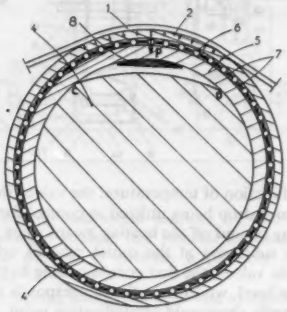
1. The method of determining the drainability of material in suspension and or stock form, especially wood fiber pulp, comprising the steps of placing a suspension of the material in water into a first container having a bottom with a multiplicity of small holes and an open top, placing the bottom of a second container which contains a measuring liquid into the open top of said first container, said bottom of said second container having small holes, and pressurizing the measuring liquid in said second container to cause it to flow into said first container, through the material and out of said container through the small holes in the botom of said first container, the rate of flow of said measuring liquid being a measure of the drainability of the material.

4,024,755

## DEFLECTOR ROLL FOR MEASURING AND CHECKING THE FLATNESS OF SHEET METAL STRETCHED IN MOTION

André Quehen, Pontoise, France, assignor to Secim, Courbevoie, France

Filed June 10, 1976, Ser. No. 694,797
Claims priority, application France, June 13, 1975, 75.18513; May 5, 1976, 76.13407
Int. Cl.² G01B 5/28
U.S. Cl. 73—105 14 Claims



1. A deflector roll for measuring and checking the flatness of sheet metal stretched in motion, said roll comprising:

a non rotatable inner portion providing axially spaced measuring zones spaced by neutral zones;

a plurality of devices for detecting radial stresses exerted by the sheet during its passage over said roll, said devices being mounted on said inner portion in said measuring zones;

an outer portion to be contacted by the sheet and capable of transmitting radial stresses executed by the sheet to said measuring devices, said outer portion being formed by a one piece envelope having a continuous outer surface and a flexibility which varies in said axial direction such that the zones of said outer portion which cover said measuring zones of said inner portion have a flexibility under radial forces which is less than the flexibility of the zones of said outer portion which cover said neutral zones of said inner portion; and

means mounting said outer portion on said inner portion for rotation relative thereto.

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4,024,756

## COMPUTER TYPE BRAKE ANALYZER

Edwin Lee Cline, Pasadena, Calif., assignor to Clayton Manufacturing Company, El Monte, Calif.

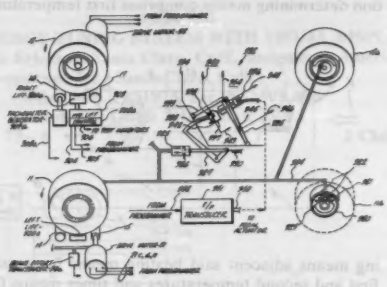
Continuation-in-part of Ser. No. 382,538, July 25, 1973, Pat. No. 3,899,916, which is a continuation-in-part of Ser. No. 811,168, March 27, 1969, abandoned. This application May 30, 1975, Ser. No. 574,271
Int. Cl.² G01L 5/28
U.S. Cl. 73—132 18 Claims

15. In an apparatus for analyzing the braking performance of a wheeled vehicle having wheel brakes individually associated with at least two wheels, the combination which comprises:

test means for rotating said wheels of the vehicle;

brake effort signal generating means including the test means for producing separate brake effort signals for each wheel, each brake effort signal being proportional to the brake effort of the respective wheel while the wheel brakes are being applied; and

means responsive to the brake effort signals for each wheel brake for producing a separate rate of change brake effort signal for each wheel brake, each rate of change



brake effort signal being representative of the rate of change of the brake effort for the respective wheel brake.

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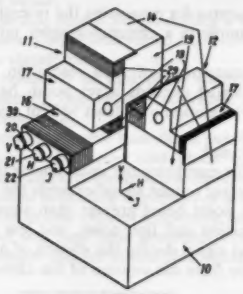
4,024,757

## GEAR TESTING MACHINE

Ulrich Raess, Regensdorf; Hans Jaeger, Volketswil, and Max Anderes, Zurich, all of Switzerland, assignors to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG, Zurich, Switzerland

Filed June 23, 1975, Ser. No. 589,607
Claims priority, application Switzerland, June 28, 1974, 8911/74
Int. Cl.² G01M 13/02
U.S. Cl. 73—162 2 Claims



1. A machine for testing bevel and hyperboloidal gears comprising:

a machine bed;

a carriage displacebly mounted on said machine bed;

two headstock beds, each havinhg a rear wall and two endwalls;

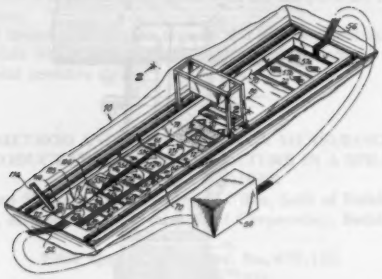
two headstocks, each headstock being displaceably mounted on one of said headstock beds, said headstocks with their headstock beds being constructed as identical components defining a first component interchangeable with a second component, the headstock bed of said first component being mounted with the rear wall thereof at the machine bed, the headstock bed of said second component being mounted with an endwall thereof at said carriage; and manually-actuable means for displacing said headstocks.

4,024,758

## SIMULATED TESTING OF UNDERSEA APPARATUS

John P. Latimer; Royal M. Hagerty, both of Newport News, and George A. Zahn, Gloucester, all of Va., assignors to Deepsea Ventures, Inc., Gloucester Point, Va.

Filed June 29, 1976, Ser. No. 700,764
Int. Cl.[2] G01N *1/00*
U.S. Cl. 73—170 A 17 Claims



1. A method of testing the effectiveness of undersea operating means intended for use on, or beneath, a sea bottom surface formed of consolidated,

soil material, the method comprising:

a. consolidating a bed of particulate soil material by a consolidation procedure comprising:

i. impressing a voltage drop vertically downwardly across a relatively unconsolidated layer of the soil material in water, wherein current flow through the water is between an upper, relatively negatively charged, electrode and a lower, relatively positively, charged electrode provided beneath the soil layer to be consolidated; and

ii. maintaining the voltage drop and current flow between the positive and negative electrodes through the water and soil layer until a layer of the soil having a desired degree of consolidation, as determined by its shear strength, is formed beneath a layer of water, whereby an underwater test bed is formed substantially simulating the mechanical properties which are desired; and

b. testing undersea operating means in operative contact with the consolidated layer of soil material, whereby undersea floor surface conditions are simulated with respect to the consolidated sea floor material.

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4,024,759

## APPARATUS FOR MEASURING THE FLOW RATE OF A FLOWING MEDIUM

Helmut Klinger, Stuttgart, and Wolfram Glauert, Bamberg, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

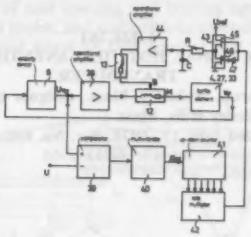
Filed Jan. 7, 1976, Ser. No. 647,152
Claims priority, application Germany, Jan. 15, 1975, 2501380
Int. Cl.[2] G01F *1/00, 1/76*
U.S. Cl. 73—194 B 16 Claims

1. An apparatus for measuring the mass flow per unit time of a medium flowing through a conduit defining a flow aperture, comprising:

A. baffle means, defining an axis of rotation and mounted within said conduit aperture for natural periodic motion within said flowing medium and provided with an extending portion made from a material with high permeability;

B. Compensating means for supplying energy to said baffle means to compensate for kinetic energy lost to the flowing medium, said compensating means including means for generating a first magnetic field and said baffle means supporting current-carrying conductors for interaction with said first magnetic field and moving in a plane at right angles to the magnetic field lines, said compensating means further including means for changing the strength of said first magnetic field in dependence on the flow rate of the streaming medium to thereby maintain the natural periodic motions of said baffle means;

C. velocity sensor means, including means for generating a voltage which is proportional to the velocity of said baffle means, said voltage being applied to said current-carrying



conductors to cause therein a current of magnitude proportional to said velocity. and

D. a source of reference potential and a comparator, said comparator receiving said reference potential and said voltage proportional to the velocity, the output from said comparator being fed to said means for generating a first magnetic field, thereby changing the field strength of said first magnetic field.

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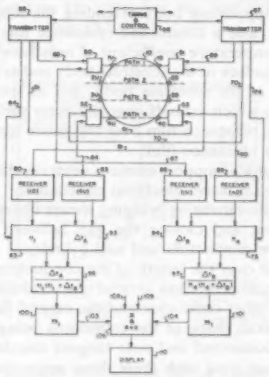
4,024,760

## FLUID FLOW MEASUREMENT APPARATUS

Herbert Estrada, Jr., Annapolis, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 25, 1975, Ser. No. 599,209
Int. Cl.[2] G01F *1/66*
U.S. Cl. 73—194 A 10 Claims



8. A method of operating a multi-path flowmeter which derives fluid flow measurements, comprising the steps of:

a. simultaneously projecting acoustic pulses through said fluid in opposite directions along two different ones of said paths and deriving values related to the travel time of at least one of said pulses and the difference in travel time of said pulses;

b. subsequently repeating the above for the reverse directions to derive further values related to the travel time of at least one of the pulses and the difference in travel time of said pulses of the subsequent projection; and

c. calculating fluid flow utilizing said values and further values.

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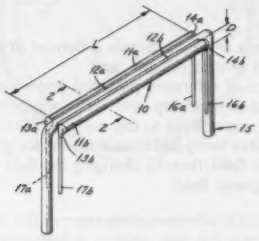
**4,024,761**
**DIRECTIONAL HOT FILM ANEMOMETER TRANSDUCER**
**Robert S. Djorup, Wellesley, Mass., assignor to Kyma Corporation, Wellesley Hills, Mass.**
**Filed June 11, 1976, Ser. No. 695,275**
**Int. Cl.² G01F 1/68**
**U.S. Cl. 73—204** **13 Claims**



1.A directional hot film anemometer transducer comprising:

a. at least two similar, thermally and physically separated resistive electrical conductors;

b. each of said conductors having a length at least equal to the largest cross section dimension of the conductor;

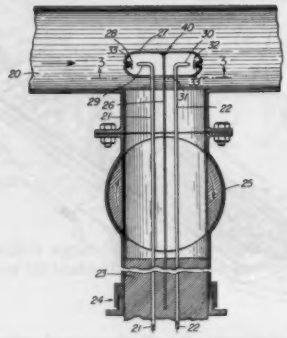
c. each of said electrical conductors including a hollow electrically non-conductive refractory cylindrical substrate supporting body extending the length of the conductor, and a conductive resistance film having a non-zero temperature coefficient of resistance adhered to the outer surface of the substrate body and extended over the length of the substrate body, and an overall protective coating which extends over the outer surface of the conductive resistance film over the entire length of the conductive resistance film;

d. a cylindrical support element centrally disposed between said two resistive electrical conductors;

e. a thermo insulating bridging means operatively disposed between, and closing the gap between said electrical resistive conductors and said cylindrical central support element over the length of the conductors, thereby prevening connected flow around one conductor independent of the other conductor and the central support element, the overall shape of the transducer being in the form of three connected and near tangent circular cross section members lying with their three respective axes parallel and on one plane, with the conductors being exposed to ventilation over at least a majority of their surface, and with the conductor cross section itself used to define the fluid dynamic cross section which is exposed to the fluid stream where the resulting local stagnation region caused by impinging flow at its point of separation against an outside electrical conductor is therefore small with respect to the conductor cross section, each conductor exhibiting a change in electrical resistivity as a function of temperature; and,

f. each of said electrical conductors being provided with electrial connection means, whereby each electrial conductor can be electrically heated by an electrical current passing through each conductor.

**4,024,762**
**DIRTY FLUID FLOW METER**
**William Walter Roberts, Jr., Yardley, Pa., assignor to Mobil Oil Corporation, New York, N.Y.**
**Filed June 1, 1976, Ser. No. 691,933**
**Int. Cl.² G01F 1/28, 1/34**
**U.S. Cl. 73—228** **3 Claims**



1. A device for measuring flow rate of fluid within a conduit comprising two tubes fixed in the conduit terminating in nozzles oppositely directed from each other, one upstream of the fluid flow and one downstream of the fluid flow, an enclosure about said nozzles having an opening for discharge from the enclosure into the stream flowing in said conduit, means for flexibly supporting said enclosure positioned as aforesaid, means to supply a fluid to each of said tubes under a pressure greater than the pressure in said conduit, means to monitor a characterisitic of the fluid flowing in each of said tubes, and a target in said enclosure adjacent to the nozzle of the said upstream tube.

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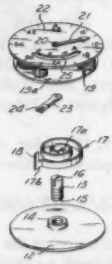
**4,024,763**
**CUMULATIVE CALORIMETER**
**Ronald R. Romano, 19834 Riverside Drive, Jupiter, Fla. 33458**
**Filed Apr. 26, 1976, Ser. No. 680,119**
**Int. Cl.² G01K 3/04**
**U.S. Cl. 73—339 R** **7 Claims**



1. In an apparatus having
a casing,
a calibrated face plate on one side of said casing for viewing,
a pointer overlying said calibrated face plate,
a metal disc of high heat conductivity mounted on the oppoostie side of said casing to be exposed directly to a source of heat,
and a heat sensitive strip anchored at one end and having an opposite free end carrying a segment which is movable with temperature changes, said strip being conductively coupled to said disc so that the position of said movable

segment corresponds to the temperature of said disc, said strip being positioned inside the casing between said disc and said calibrated face plate,

the improvement which comprises:

a clockwork positioned inside said casing between said strip and said calibrated face plate and driving said pointer;

means operatively coupling said movable segment of the heat sensitive strip to said clockwork to regulate the latter's speed in accordance with the temperature of said disc;

and means providing an arcuate slot in said calibrated face plate which registers with said movable segment of the heat sensitive strip.

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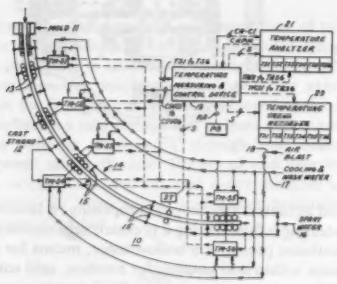
## 4,024,764

## METHOD AND APPARATUS FOR MEASURING PRODUCT SURFACE TEMPERATURE IN A SPRAY COOLING CHAMBER

**Johnson Shipman, and Herbert L. Gilles, both of Bethlehem, Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.**

**Filed Apr. 22, 1976, Ser. No. 679,116**
**Int. Cl.² G01K *1/00***
**U.S. Cl. 73—340** **20 Claims**



19. Apparatus for measuring the surface temperature of a hot product while spray cooling the product in a spray region, comprising:

a. plural sensing means for producing separate surface temperature signals of the product at a corresponding plurality of predetermined locations in the sensing region,

b. timing means for producing a corresponding plurality of first control signals during a temperature sampling interval,

c. plural means each responsive to a corresponding first control signal for interrupting the product spray cooling at respective temperature sensing locations only during the sampling interval, and

d. plural means for separately detecting and storing the peak of each surface temperature signal occuring during the sampling period.

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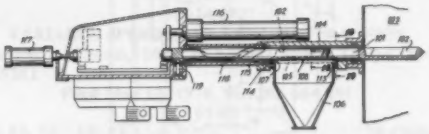
## 4,024,765

## AUTOMATIC VOLUMETRIC DEVICE FOR TAKING SAMPLES OF GRANULAR OR POWDERED MATERIAL

**Jean Abonnenc, 42 rue Laugier, Paris 75017, France**

**Continuation-in-part of Ser. No. 675,213, April 8, 1976, which is a continuation of Ser. No. 526,049, Nov. 21, 1974, Pat. No. 3,949,614. This application May 7, 1976, Ser. No. 684,451**
**Claims priority, application France, Nov. 29, 1973, 73.42631; May 16, 1974, 74.17116; Oct. 17, 1974, 74.34956**
**Int. Cl.² G01N *1/20***
**U.S. Cl. 73—422 TC** **10 Claims**

1. Automatic volumetric apparatus for taking representative samples of granular material comprising a horizontal cylindrical probe having a recess which has an open lateral face to permit the taking of a sample of pre-determined volume of material, a fixed obturator sleeve slidably and rotatably receiving said probe, said sleeve having an opening with longitudinal and transverse edges, said opening facing downwards and being of a size at least as great as the recess in the probe to constitute a discharge outlet for the sample of material, sealing means mounted on said sleeve around said opening and in contact with said probe at the outer surface thereof, said sealing means comprises a one-piece sealing element including longitudinal portions extending axially at the longitudinal edges of said opening and bearing against the outer surface of said probe, and end portions extending tranversely at the transverse edges of said opening and having curved



surfaces bearing against the outer surface of said probe, drive means for axially and angularly displacing the probe to cause the probe to move between a retracted position in which the recess in the probe is in a discharge zone and faces downwardly in registry with the opening in the sleeve at the time of discharge, and an extended position in which the probe is in a sampling zone and said recess in the probe faces upwardly, and means associated with said probe at the front of said recess for preventing breakage of particles between said probe and said obturator sleeve as the probe moves to said retracted position thereby preventing transport of broken particles to said discharge outlet.

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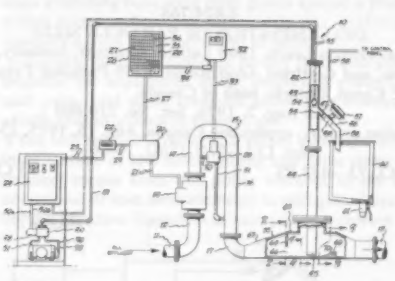
## 4,024,766

## WASTE WATER SAMPLING SYSTEM

**Jack A. Perry, 920 Mohawk St., Lewiston, N.Y. 14092**

**Filed Jan. 19, 1976, Ser. No. 650,377**
**Int. Cl.² G01N *1/14***
**U.S. Cl. 73—422 R** **14 Claims**

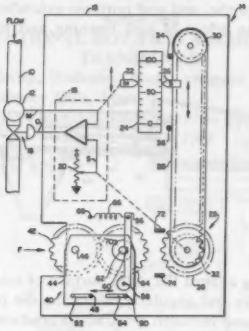


1. A liquid sampler comprising liquid conduit means, a force main sampling chamber in communication with said conduit means, a seal leg having an end portion in said sampling chamber, level maintaining means for maintaining a predetermined level of liquid in said sampling chamber to insure the immersion of said end portion of said seal leg in said liquid in said sampling chamber, said conduit means being a conduit of a first diameter and said sampling chamber being a conduit of a second diameter which is greater than said first diameter whereby flow in said second conduit is slower than flow in said first conduit, and baffle means extending downwardly from the top of said second conduit and located between said first conduit and said seal leg for defining an opening below said baffle means to insure that flow is directed toward the end portion of said seal leg.

## 4,024,767
## SET POINT ADJUST MECHANISM FOR PROCESS CONTROLLERS

Richard S. Kampf, Costa Mesa, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed June 2, 1975, Ser. No. 583,232
Int. Cl.² G05B 1/01; G05D 7/06
U.S. Cl. 73—432 A 5 Claims



1. Apparatus for the simultaneous moving of two devices operably connected to and moved by a driven gear to prevent dislocation between the positions of the two devices when the motion of one of the devices or the driven gear is impeded, the apparatus comprising:

a. a driving gear adapted to engage the driven gear;

b. releasable bias means for releasably holding said driving gear in a first position and allowing said driving gear to move normal to its axis from said first position to a second position in response to the driven gear attaining a level of resistance to movement sufficient to cause said driving gear to overcome the force of said bias means; and,

c. mechanical stop means for engaging said driving gear only when said driving gear reaches said second position to prevent further rotation of said driving gear.

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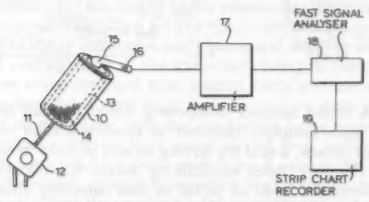
## 4,024,768
## DETERMINATION OF PARTICLE SIZES

Marcel Francis Leach, 1800 Latimer Crescent, Sudbury, Ontario, and Gottfried Adolf Rubin, 3269 Parkdale Crescent, Val Caron, Ontario, both of Canada

Filed Aug. 2, 1976, Ser. No. 710,409
Claims priority, application Canada, Aug. 15, 1975, 234092
Int. Cl.² G01N 15/02, 29/00
U.S. Cl. 73—432 PS 13 Claims




1. A process of determining average particle sizes and particle size distributions of a plurality of particles of a hard substance capable of substantially elastic impact together, which comprises the steps of:

impinging the particles against one another;

detecting the sound caused by such impingement;

converting the sound into corresponding electrical impulses, and recording the electrical impulses;

analyzing the beat pattern of recorded electrical impulses to determine particle size characteristics of the impinging particles generating said impulses.

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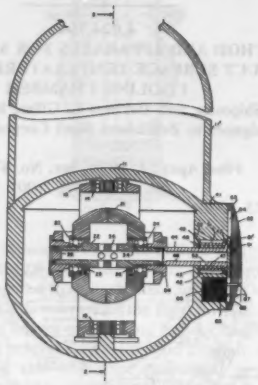
## 4,024,769
## FLUID ACTUATED GYROSCOPE

Paul F. Hayner, Gilford, N.Y., assignor to Sanders Associates, Inc., South Nashua, N.H.

Filed May 23, 1975, Ser. No. 580,266
Int. Cl.² G01C 19/12, 19/26
U.S. Cl. 74—5.12 32 Claims



1. A fluid actuated gyroscope, comprising, a housing capable of containing a fluid having a pressure substantially greater than the ambient pressure, a hollow rotor, means for supporting said rotor within said housing for rotation, said rotor being formed with an aperture providing fluid communication between the interior and exterior thereof, characterized in that said aperture is located and shaped to define a nozzle for urging said rotor to rotate in response to the flow of fluid from the exterior of said rotor through said aperture to the interior thereof, and in that there are included means defining a fluid passageway isolated from the interior of said housing and extending from the interior of said rotor to the exterior of said housing, means for blocking said passageway, and means for unblocking said passageway.

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## 4,024,770
## SEALED JOINT

Roland Liesenborghs, Avenue du Hetre, 22, B.4200 Sclessin, Belgium

Filed May 12, 1975, Ser. No. 576,749
Claims priority, application Belgium, May 10, 1974, 44576; Jan. 9, 1975, 44888
Int. Cl.² F16J 15/52
U.S. Cl. 74—18.2 3 Claims

1. A fluidtight flexible seal for sealing inner and outer cylindrical members to each other for movement of the inner member relative to the unmovable outer member, said seal comprising:

a first annular sleeve of U-shaped cross-sectional configuration and of flexible fluidtight material,

an outer annular flange projecting outwardly from the outer leg of said first annular sleeve,

an inner annular flange projecting inwardly from the inner leg of said first annular sleeve,

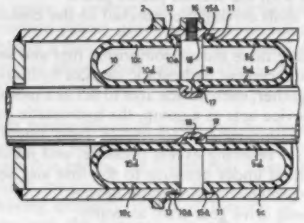
a second annular sleeve of U-shaped cross-sectional configuration and of flexible fluidtight material, said second annular sleeve being arranged oppositely to the first sleeve and the sleeves opening toward each other,

an outer annular flange projecting outwardly from the outer leg of said second annular sleeve,

an inner annular flange projecting inwardly from the inner leg of said second annular sleeve,

annular groove means in the outer face of said movable inner member, wherein said both inner flanges of said sleeves are secured in fluidtight relationsip to said inner member,

a first annular groove in the inner face of said unmovable outer member, wherein said outer flange of said first sleeve is secured in fluidtight relationship to said outer member,



a second annular groove in said inner face of said unmovable outer member, wherein said outer flange of said second sleeve is secured in fluidtight relationship to said outer member, said second groove being axially spaced from the first groove, whereby a closed annular chamber is defined by said sleeves and at least said outer member,

means defining an opening through said outer member between said both outer flanges of said sleeves,

and a socket mounted on said outer member about said opening for introducing fluid under pressure into said annular chamber.

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**4,024,771**

## VARIABLE SPEED RATIO DRIVE MECHANISM

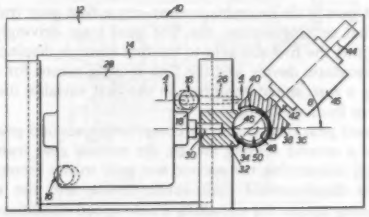
**Beresford Clair Joseph, 378 Victoria St., Brunswick, Victoria, Australia**

**Filed Oct. 2, 1975, Ser. No. 619,036**

**Claims priority, application Australia, Oct. 2, 1974, 9137/74**

**Int. Cl.² F16H** *15/26*

**U.S. Cl. 74—198** **6 Claims**



1. A variable speed ratio drive mechanism comprising a pair of friction members mounted for rotation about respective axes of rotation, said friction members presenting opposed friction surfaces at facing ends thereof, said surfaces both frictionally engaging, at respective points of contact thereon, a spherical ball located between the surfaces whereby, when the points of contact are spaced away from the respective axes, rotary motion of one friction member can be transmitted to the other via said ball, and means being provided for altering the distance of at least one of the points of contact from the axis of its associated friction member whereby to vary the drive ratio between said members; said surfaces being part-spherical concavities with centres on respective friction member axes, the radii of curvature of the respective surfaces being greater than the radius of curvature of the ball and said ball being maintained captured between said surfaces, said means mounting said friction members with axes in non-aligned angular relationship and substantially in a common plane and said means being operable to effect movement of one friction member relative to the other on a circular path of radius equal to the sum of the radii of curvature of the friction surfaces less twice the radius of said ball, while maintaining said angular relationship substantially constant, whereby said movement effects said altering of said distance to vary said ratio.

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**4,024,772**

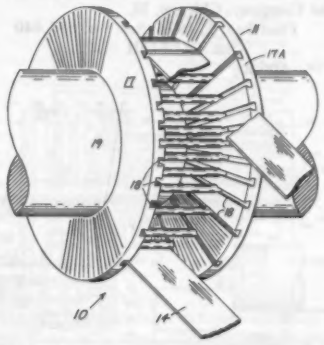
## VARIABLE SPEED FLAT BELT TRANSMISSION

**Emerson L. Kumm, 1035 E. Laguna Drive, Tempe, Ariz. 85282**

**Filed May 10, 1976, Ser. No. 684,491**

**Int. Cl.² F16H** *55/52*

**U.S. Cl. 74—230.16** **18 Claims**



1. A variable speed flat belt drive comprising:

a. a pair of pulley members mounted for rotary movement on spaced axes, each of said pulley members having axially spaced groups of circumferentially spaced guideways extending outwardly from points spaced a predetermined distance from the pulley axis, the guideways in opposed groups being arranged in pairs;

b. a plurality of drive elements having their end portions disposed for adjustment in the respective guideways of said pairs, said drive elements extending between said axially spaced guideway groups; and

c. a flat belt trained around said pulley members with the inner surface of said belt engaging said drive elements to transmit torque from one pulley member to the other, adjustment of said drive elements in said guideways varying the effective diameters of said pulley members.

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**4,024,773**

## ENDLESS POWER TRANSMISSION BELT STRUCTURE

**Russell E. Hartman, and Dewey D. Henderson, both of Springfield, Mo., assignors to Dayco Corporation, Dayton, Ohio**

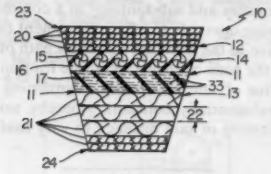
**Filed June 1, 1976, Ser. No. 691,958**

**Int. Cl.² F16G** *5/16*

**U.S. Cl. 74—233** **26 Claims**

1. An endless substantially trapezoidal power transmission belt structure having reduced coefficient of friction raw-edged non-parallel sides and comprising, a tension section, a compression section, a continuous thermally stable longitudinally extending load-carrying cord disposed between said sections and defined by a plurality of helically wound turns, at least one platform adjoining said load-carrying cord, said platform comprising an elastomeric matrix having an anti-friction mate-

rial dispersed therethrough in a homogeneous manner to reduce the coefficient of friction of said sides, a fabric layer




defining the inside surface of said belt, and a fabric layer defining the outside surface of said belt.

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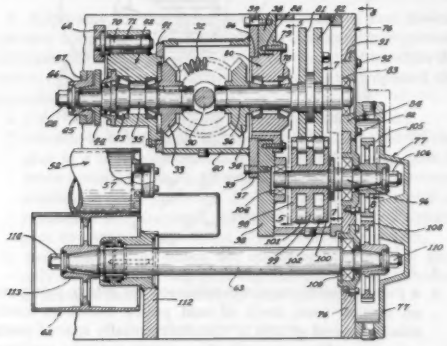
**4,024,774**

## MODULAR CAM DRIVEN ROLL FEED

**Kenneth C. Johnson, Des Plaines, Ill., assignor to F. J. Littell Machine Company, Chicago, Ill.**

**Filed Feb. 5, 1976, Ser. No. 655,440**
**Int. Cl.² F16H** *57/02*
**U.S. Cl. 74—606 R** **8 Claims**



1. In cam driving apparatus of the character described, the combination with a housing including two apaced walls, of a driving shaft within said housing, means for journalling the said shaft for rotation including a bearing cartridge retainer in one wall of the housing, said bearing cartridge retainer having a center opening through which the shaft extends and also having a machined peripheral surface the center of which is eccentric to the center of the shaft, and the said one wall of the housing having an opening therein for receiving the cartridge retainer in a manner whereby the peripheral surface thereof has close contacting relation with the inside surface of said opening.

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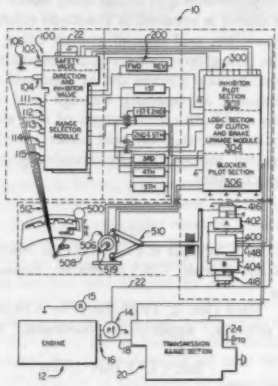
**4,024,775**

## HYDROSTATIC MECHANICAL TRANSMISSION AND CONTROLS THEREFOR

**Arlynn W. Anderson, Peoria; Delbert D. Dester, Washington, and Edwin E. Hanson, Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed July 9, 1975, Ser. No. 594,430**
**Int. Cl.² F16H** *47/04*
**U.S. Cl. 74—687** **11 Claims**

1. A split torque transmission comprising:
an input shaft;
an output shaft;
a recycling planetary unit comprising a first planetary gear assembly, and a second planetary gear assembly, the first and second planetary gear assemblies having a common planet gear carrier;
said first planetary gear assembly further comprising a first sun gear, a plurality of first planet gears carried by the common planet carrier, and a first ring gear, the first sun gear intermeshing with the first planet gears, and the first planet gears intermeshing with the first ring gear;
said second planetary gear assembly further comprising a second sun gear, a plurality of second planet gears carried by the common planet carrier, and a second ring gear, the second sun gear intermeshing with the second planet gears, and the second planet gears intermeshing with the second ring gear, the first planet gears in intermeshing relation with the second planet gears;
the input shaft drivingly connected to the common planet carrier;
a hydrostatic drive means comprising first and second variable displacement hydrostatic devices hydraulically coupled together, each device able to act as a motor while the other device acts as a pump, the hydrostatic drive means further comprising a source of fluid under pressure, means for relieving excess pressure, and means for providing fluid under pressure to the first and second variable displacement hydrostatic devices;
a directional drive gear train assembly;




a first gear train assembly comprising a first gear train and a first sensing means, the first gear train drivingly connecting the first sun gear to the first variable displacement hydrostatic device and the first sensing means for signalling a zero speed condition in the first variable displacement hydrostatic device;
a second gear train assembly comprising a second gear train and a second sensing means, the second gear train drivingly connecting the second sun gear to the second variable displacement hydrostatic device and the second sensing means for signalling a zero speed condition in the second variable displacement hydrostatic device;
a third gear train assembly drivingly connected with the first ring gear;
a fourth gear train assembly drivingly connected with the second ring gear;
first clutch means for allowing selective engagement and disengagement of the second gear train assembly with the directional drive gear train assembly;
second clutch means for allowing selective engagement and disengagement of the fourth gear train assembly with the directional drive gear train assembly;
third clutch means for allowing selective engagement and disengagement of the third gear train assembly with the output shaft;

fourth clutch means for allowing selective engagement and disengagement of the fourth gear train assembly with the output shaft;

the directional drive gear train assembly comprising;

a directional planetary gear assembly comprising a directional planet carrier, a plurality of forward planet gears carried by the directional planet carrier, a plurality of reverse planet gears carried by the same directional planet carrier adjacent to and independent of the forward planet gears, a plurality of intermediate planet gears carried by the same directional planet carrier in the same plane as the reverse planet gears and intermeshing therewith, a forward sun gear intermeshing with the forward planet gears, a reverse sun gear intermeshing with the intermediate planet gears, and a nonrotating ring gear movable in a first direction to a first position to engage the forward planet gears and movable in a second direction to a second position to engage the reverse planet gears;

drive shaft means driven at a first end by the second gear train while the first clutch means is engaged and driven at the same first end by the fourth gear train while the second clutch means is engaged, the drive shaft means further having drivingly mounted thereon at the second opposite end the forward sun gear of the directional planetary gear assembly and adjacent thereto the drive shaft means having drivingly mounted thereon the reverse sun gear of the directional planetary gear assembly; and

directional drive engagement means comprising a directional clutch means for selectively engaging or disengaging the directional planet carrier with the output shaft.

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**4,024,776**

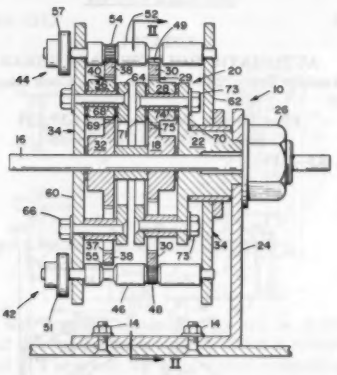
**VARIABLE RATIO PLANETARY ASSEMBLY**

**Robert A. Stinson, Aurora, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Sept. 17, 1975, Ser. No. 614,046**

**Int. Cl.² F16H** *37/00, 47/04*

**U.S. Cl. 74—689** **9 Claims**



1. A variable ratio planetary assembly comprising:

support means;

an input shaft rotatably mounted on said support means;

an output assembly rotatably mounted relative to said input shaft;

first drive gear means rotatably mounted on said output assembly;

second drive gear means rotatably mounted on said output assembly;

a first planetary gear assembly drivingly connected to said input shaft and driving said first drive gear means;

a second planetary gear assembly drivingly connected to said input shaft and driving said second drive gear means, the first and second planetary gear arrangement being sized and configured so that, with the output assembly held in position relative to the support means the first drive gear means is rotated to define a peripheral speed of a portion thereof different from the peripheral speed of a portion of the second drive gear means, said peripheral speeds of said portions defining a first peripheral speed ratio; and,

means for interconnecting said portions of the first and second drive gear means so that said portions are made to turn relative one to the other at a second peripheral speed ratio, wherein the output assembly is rotated relative to the support means by rotation of the input shaft.

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**4,024,777**

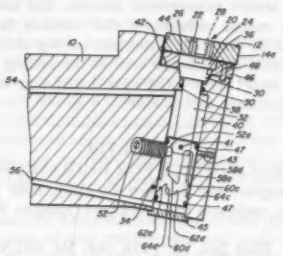
**AUTOMATICALLY INDEXABLE CUTTING TOOL**

**Derrell Jean Fogarty, 1754 Bayram, Houston, Tex. 77055**

**Filed June 3, 1976, Ser. No. 692,286**

**Int. Cl.² B23B** *29/24*

**U.S. Cl. 82—36 A** **14 Claims**



1. A cutting tool comprising:

a cutter assembly comprising a cutting implement having a cutting surface and a shank extending longitudinally from said cutting implement;

a housing assembly having a bore for receipt of said shank, said shank being longitudinally extendable and retractable in said bore;

and means defining guide surfaces interengageable between said cutter assembly and said housing assembly for automatically rotating said cutter assembly upon extension and retraction of said shank in said bore to change the position of said cutting surface.

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**4,024,778**

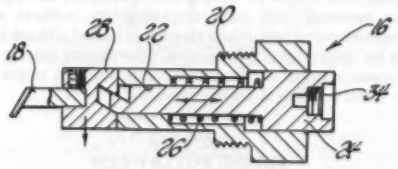
**RETRACTABLE TOOL HOLDER**

**James R. De Fauw, 911 Wadsworth, Pontiac, Mich. 48053**

**Filed Oct. 6, 1975, Ser. No. 619,650**

**Int. Cl.² B23B** *29/00, 51/00*

**U.S. Cl. 82—36 R** **1 Claim**



1. A cutting tool holder for use with cutting tool machines having the work piece rotated relative to the working tool, and comprising; a housing suitable for being held and retained within a work tool chucking device and having a bore provided therewithin which is receptive of a retractable tool holder protruding through one end thereof and supported therewithin, a piston member received in said bore and having

means of actuating engagement with said retractable tool holder and a piston rod extending through the opposite end of said bore, an end wall closure on said housing for closing said bore and having said piston rod extended therethrough, micrometer adjustment means provided on the end of said piston rod for relatively setting said piston member in said bore, air pressure passage means provided through the external wall of said housing and in communication with said bore for pressurized actuation of said piston to set said cutting tool and to selectively provide and remove tool support therefore, and means operative on the other side of said piston member for actuation thereof in the opposite direction immediately upon and simultaneous with the removal of tool support therefrom, said housing member having air pressure passage means in communication with said bore on the other side of said piston member and serving at least partially as said last mentioned operative means, said housing member having one end of said bore restricted to provide a shoulder stop flange and which is threaded for retaining engagement with said retractable tool holder, and said piston member having like means of shoulder stop and threaded engagement with said retractable tool holder for secure engagement thereto, and said micrometer adjustment means including a dial member in threaded engagement with said piston rod and having abutment engagement with said end closure wall in the setting of said piston member in said bore and the work cut of a cutting tool carried by said retractable tool holder.

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**4,024,779**

## ANTI-ROLL DEVICE FOR ULTRAMICROTOMES

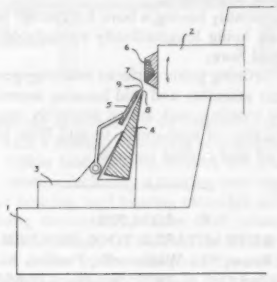
**Roland Taugner, and Juergen Eschwey, both of Heidelberg, Germany, assignors to C. Reichert Optische Werke, Vienna, Austria**

**Filed Jan. 28, 1976, Ser. No. 652,952**

**Claims priority, application Germany, Feb. 14, 1975, 2506255**

**Int. Cl.² B26D *7/06*; G01N *1/06***

**U.S. Cl. 83—165** **8 Claims**



1. In an ultramicrotome for cutting specimen sections, the improvement comprising two glass fragments of a single piece of glass, said fragments having complementary surfaces, and being mounted with said complementary surfaces spaced juxtaposition and one of said fragments having a sharp leading edge for cutting specimen sections whereby the cutting enters the space between said complementary surfaces as the specimen is cut to prevent curling thereof.

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**4,024,780**

## FLYING ROTARY SAW

**Jerzy F. Patejak, Wampum, Pa., assignor to Aetna-Standard Engineering Company, Ellwood City, Pa.**

**Filed June 17, 1975, Ser. No. 587,605**

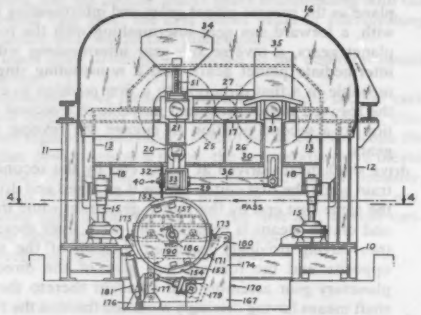
**Int. Cl.² B23D *45/22***

**U.S. Cl. 83—306** **7 Claims**

3. In an apparatus for severing successive longitudinal sections from continuously moving elongated work having a cutting saw movable in a circular path, means for guiding the work in a normal path spaced a short distance from such circular path, and means for periodically deflecting the work from its normal path into the path of the saw to permit severing of said sections, the improvement which comprises

a. a main crank arm having a central portion mounted to turn about a first axis,

b. a stabilizing crank arm parallel to and spaced from said main crank arm and having a central portion mounted to turn about a second axis parallel to and spaced from said first axis,



c. means mounting said cutting saw directly on the end of said main crank arm,

d. a connecting rod pivotally connected at one end to one end of said stabilizing crank arm and rigidly connected at its opposite end to said cutting saw,

e. a counterweight mounted on each of said crank arms at the end thereof remote from said connecting rod,

f. the counterweight on said stabilizing arm being fixed thereon, and

g. means for adjusting the counterweight on said main crank arm.

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**4,024,781**

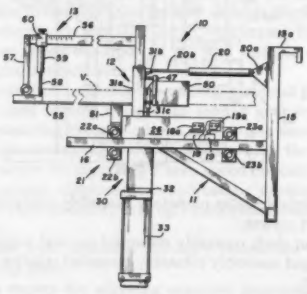
## AUTOMATIC HOLLOW VANE SHEAR

**J. W. Franklin Tracy, 248-106 Ave. NW., Coon Rapids, Minn. 55435**

**Filed Dec. 4, 1975, Ser. No. 637,531**

**Int. Cl.² B23D *25/04*, *25/16***

**U.S. Cl. 83—319** **12 Claims**



1. A device for automatically shearing hollow vanes, which hollow vanes are driven into the device; said device including:

a. a supporting section having a generally horizontally extending track section;

b. a shearing and clamping section arranged for movement on said track section, said shearing and clamping section including;

1. a die arranged to receive and allow a formed hollow vane to pass therethrough, said die including a pair of generally triangular shaped die elements to agree with a surface of the vane to be sheared, said die elements being spaced from one another to permit said shearing blade to pass therethrough to shear the vane;
2. a shearing blade arranged on association with said die for shearing of a vane received therein;
3. clamping means for clamping the vane against one surface of said die during the shearing thereof;
4. means for sequentially actuating said clamp means and said shearing blade;
5. sensing means associated with said shearing and clamping section to control movement thereof and actuation of said clamping and shearing means;

c. vane length determining means extending forwardly from said shearing and clamping section and being movable therewith, including stop means for receiving the vane thereagainst and moving the same along with said shearing and clamping section; and,

d. sensing means for controlling said clamping means and said shearing blade subsequent to abutment of the vane with said stop means and movement of said shearing and clamping section.

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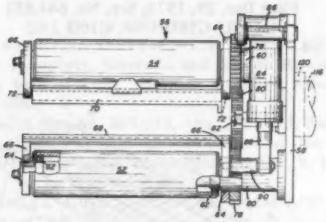
**4,024,782**

## APPARATUS FOR CUTTING THE TRAILING END OF AN EXPIRING WEB

**Martin W. Kron, and Victor I. Polz, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Division of Ser. No. 456,484, April 1, 1974, Pat. No. 3,915,399. This application June 27, 1975, Ser. No. 590,898**
**Int. Cl.² B26D** *5/02*
**U.S. Cl. 83—373** **3 Claims**



1. In a web severing mechanism for use in severing the trailing end of a moving expiring web which is spliced to the leading end of a new roll, the combination comprising:

a frame:

web guiding means comprising a pair of spaced apart parallel members cantilevered from said frame;

means for moving said frame from a retracted position in which said members are laterally spaced from said web to an extended position in which said members straddle said moving expiring web;

means for rotating said frame through an angle while in said extended position for moving said members to a guiding position for engaging and guiding said moving expiring web along a substantially S-shaped path to form a straight reach of web extending between said members; and

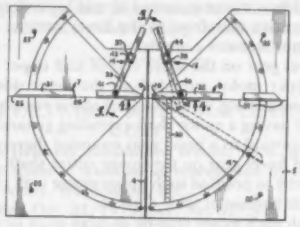
means rotatably mounted on said members and cooperating together for severing said straight reach of web.

**4,024,783**

## POWER SAW APPARATUS AND MITER ATTACHMENT THEREFOR

**Clifford M. Sturgis, 1213 Westmoreland, Colorado Springs, Colo. 80907**

**Filed Jan. 14, 1976, Ser. No. 649,095**
**Int. Cl.² B27B** *27/06*
**U.S. Cl. 83—468** **8 Claims**



1. A power saw apparatus comprising:

a. a support structure having a table top portion with front and rear edges and with a cutting path therein substantially normal to said front and rear edges;

b. a power saw having a cutting blade;

c. means mounted on said support structure and including an arm positioned above said table top portion and having said power saw movably supported thereon for guiding said power saw during movement thereof along said cutting path;

d. first and second fence members positioned on respective opposite sides of said cutting path and each having one end thereof pivotally mounted on said table top portion in spaced relation to the rear edge thereof and adjacent said cutting path for permitting movement to selected adjusted angular position relative to said cutting path; and

e. first and second means mounted on said table top portion between said rear edge and respective fence members and connected respectively to said first and second fence members for respectively retaining same in a respective selected angular position.

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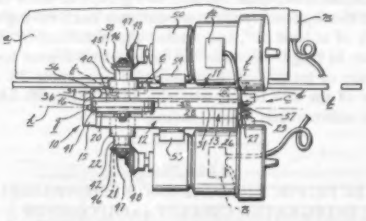
**4,024,784**

## ROTARY SLITTING SHEAR HAVING SEPARATELY POWERED CUTTERS

**Thomas L. Mueller, St. Louis, Mo., assignor to Engel Industries, Inc., St. Louis, Mo.**

**Filed Jan. 23, 1976, Ser. No. 651,639**
**Int. Cl.² B26D** *1/24*
**U.S. Cl. 83—488** **2 Claims**



1. In that type of sheet metal shear which propels itself along a track adjacent to an edge of a horizontal work surface, the shear having an upper rotary cutter and a lower rotary cutter whose edges are adjacent to each other in cutting relationship along a vertical plane of cut, the upper rotary cutter being mounted at the inner end of an upper lateral shaft

through the forward part of an upper frame portion lying inward of the line of cut and above the plane of such horizontal work surface, the lower cutter being mounted at the inner end of a lower lateral shaft through the forward part of a lower frame portion lying outward of such vertical plane of cut, its forward frame part being beneath the plane of such horizontal work surface, the lower frame portion having a bridge juncture part whose upper edge slants upward and aft to overlap and join the aft lower part of the upper frame portion, there being a lower motor mounted to said lower frame portion and a power drive therefrom to the lower cutter,

the improvement comprising

a bevel gear on the inner end of said upper shaft, and

an upper motor mounted on the inner side of the upper frame portion with clearance above such horizontal plane and having a motor shaft extending generally forward and downward to a bevel gear mounted thereon in mesh with said bevel gear on the upper cutter shaft,

whereby to position such upper motor with clearance above such horizontal table surface,

though such motor may be as large as or larger in diameter than the diameter of said upper cutter.

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**4,024,785**

**SPIRAL SAW BLADE**

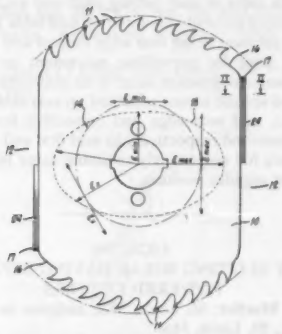
**Röttger Jansen-Herfeld, Remscheid-Hasten, Germany, assignor to W. F. Meyers Company, Inc., Bedford, Ind.**

**Filed Feb. 27, 1974, Ser. No. 446,492**

**Claims priority, application Germany, Mar. 8, 1973, 2311377**

**Int. Cl.² B49C *61/02***

**U.S. Cl. 83—848** **1 Claim**



1. A spiral saw blade whose teeth are divided into two groups and in each group the foremost tooth is followed by teeth whose tips extend in succession farther out of the spiral saw blade than does the foremost tooth, characterized in that in the saw blade between the said two groups of teeth there is provided two oppositely disposed cut-outs each having a central angle of at least 30°, and further characterized in that the difference in height between the highest and lowest tooth of each group of teeth is of the magnitude or at most 2% of the diameter of the saw blade, whereby all of the teeth are subjected to substantially equal loading.

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**4,024,786**

**ELECTRONIC MUSICAL INSTRUMENT USING INTEGRATED CIRCUIT COMPONENTS**

**William V. Machanian, Lewiston, N.Y., assignor to The Wurlitzer Company, Chicago, Ill.**

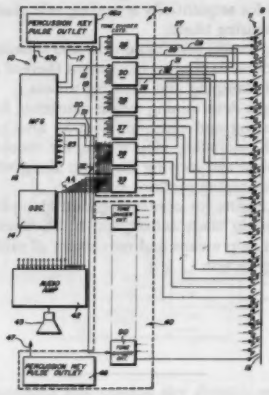
**Continuation of Ser. No. 475,448, June 3, 1974, abandoned.**

**This application July 25, 1975, Ser. No. 599,166**

**Int. Cl.² G10H *1/00, 5/06***

**U.S. Cl. 84—1.01** **24 Claims**

1. An electronic musical instrument comprising: a multi-frequency generator for generating a plurality of different frequency signals, first circuit means coupled to said multi-frequency generator for providing harmonic frequencies of said plurality of different frequencies, second circuit means coupled to said first circuit means for combining at least one of said harmonic frequencies with a selected one of said frequency signals from said multi-frequency generator means,



electroacoustic transducer means for receiving the combined signals and reproducing the same, and third circuit means coupled to said second circuit means, and responsive to said selected one of said frequency signals for producing a pulse output as a result of the selection thereof for energizing independent electronic circuitry associated with said electronic musical instrument.

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**4,024,787**

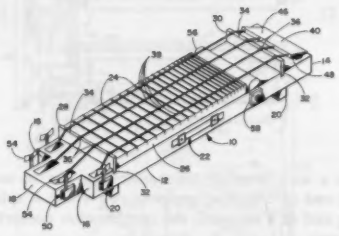
**FOOT OPERATED MUSICAL INSTRUMENT**

**Harold W. Larson, 1204 - 26th St., Fort Madison, Iowa 52627**

**Filed Dec. 29, 1975, Ser. No. 644,851**

**Int. Cl.² G10D *1/00*; G10H *3/02***

**U.S. Cl. 84—1.16** **11 Claims**



1. A foot operated musical instrument adapted to be placed on a floor, comprising

A. an elongate base,

B. means for supporting said base in a spaced relation with said floor,

C. a plurality of transversely disposed frets spaced axially along an intermediate portion of said base,

D. a plurality of metallic strings extending longitudinally of said base,

E. means for tensioning said strings in a flat plane spaced from and parallel to the top of said frets,

F. means for spacing said strings transversely of one another a distance sufficient to permit manual depression of a

single selected string against one of said frets in response to contact between said string and a portion of the user's foot, and

G. means for picking up vibrations from said depressed string and converting said vibrations into electrical signals suitable for amplification.

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**4,024,788**

## MUTE FOR STRINGED INSTRUMENTS

**Daniel Dunlap, 32 W. 69th St., Apartment 3-A, New York, N.Y. 10023**

**Filed Mar. 19, 1976, Ser. No. 668,453**
**Int. Cl.² G10D** *3/04*
**U.S. Cl. 84—267** **9 Claims**

1. In a musical instrument having a hollow body, a fingerboard attached to said body, a plurality of strings stretched along said fingerboard, and at least one sound hole in said body providing acoustic communication between the interior and the exterior thereof, the improvement comprising:

a removable member of soft, flexible, sound-absorbing material located adjacent the exterior of each sound hole and forming a substantially complete closure for the same, and resilient means secured to said member, extending into the sound hole closed by said member said resilient means bearing against the periphery of the sound hole into which it extends and thereby holding said member in position.

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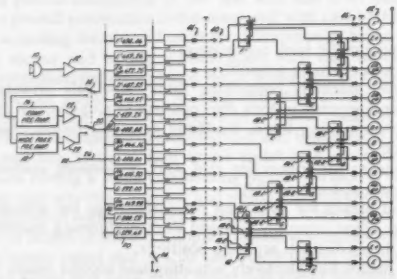
**4,024,789**

## TONE ANALYSIS SYSTEM WITH VISUAL DISPLAY

**Thomas D. Humphrey, Silverado, and John H. Humphrey, Los Angeles, both of Calif., assignors to Murli Advani, Villa Park, Calif.**

**Division of Ser. No. 393,033, Aug. 30, 1973, Pat. No. 3,894,186, which is a continuation-in-part of Ser. No. 299,189, Oct. 20, 1972, abandoned. This application Dec. 9, 1974, Ser. No. 530,734**
**Int. Cl.² G09B** *15/02, 19/04;* **H04M** *1/00*
**U.S. Cl. 84—477 R** **8 Claims**



1. A device for visually identifying the notes of a musical scale which comprises:

means for converting musical tones to electrical waves;

a plurality of filters connected to said converting means each tuned to pass the frequency of one of the notes of the musical scale;

a plurality of lamps individually energizable under the control of said filters to represent the notes corresponding to the tones passed by said filters; and

switching means for selectively establishing as between any lamp representing the natural of a note and its correspondingly designated filter a reassociation of lamps and filters to introduce either a sharp or a flat substitution.

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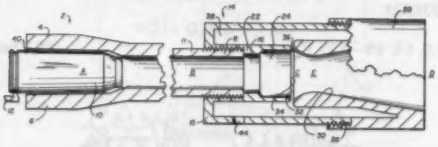
**4,024,790**

## BORE GAS EVACUATION DEVICE FOR CANNONS AND GUNS

**Conrad Elmer Heiderer, Huntington Woods, Mich., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Oct. 31, 1975, Ser. No. 627,579**
**Int. Cl.² F41F** *17/12, 17/14*
**U.S. Cl. 89—1 E** **3 Claims**



1. In a weapon system having a receiver and gun barrel, the improvement comprising a bore gas evacuation system including an axially bored housing attached to the muzzle end of the gun barrel,

a gas accumulator chamber in said housing, said housing having an internal projection with an axial bore therein communicating with the bore of the gun barrel and opening into an enlarged end recess, said end recess terminating in an end wall defining one side of a Coanda slot,

a nozzle member in said housing having an end wall defining the other side of said Coanda slot,

the interior of said nozzle including a converging parabolic section located adjacent said Coanda slot, and a divergent section separated from said converging section by a throat section, whereby when said receiver is opened, air at ambient pressure is drawn into said gun barrel by the combined effect of the aspirated ejection gases and propellant gases flowing toward said muzzle under the influence of the Coanda effect.

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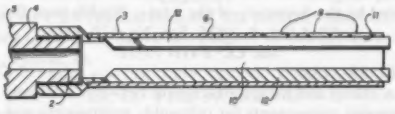
**4,024,791**

## GUN MUZZLE FLASH SUPPRESSOR

**Urban Frederick Stratman, Taylor Ridge, Ill., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Oct. 28, 1975, Ser. No. 626,012**
**Int. Cl.² F41F** *17/12*
**U.S. Cl. 89—14 B** **2 Claims**



1. In a weapon tube including a gun having a muzzle, a gun muzzle flash suppressor comprising:

an extension adapted for attachment on the end of said muzzle, said extension having a cylindrical inner surface

of a diameter larger than that of the inner diameter of said muzzle,

said extension having a plurality of angled apertures extending through the wall thereof, said apertures being angled rearwardly toward said muzzle in a direction from the inner surface to the outer surface of said wall,

a plurality of spaced baffle bars extending longitudinally along the inner surface of said wall and extending radially inwardly so the inner edges of said baffle bars encircle an area of sufficient diameter for a projectile from said gun muzzle to pass therethrough, whereby a pressure drop in said extension causes propellant gases flowing in said gun tube to aspirate ambient air into said extension for mixture with said gases, thereby to reduce the light emission from said gun tube.

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**4,024,792**

## AUTOMATIC SHOULDER ARM

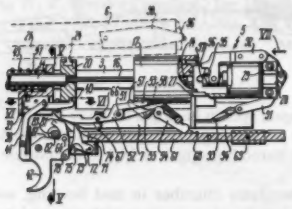
**Tilo Möller, Oberndorf, Germany, assignor to Heckler & Koch GmbH, Oberndorf, Germany**

**Filed May 23, 1974, Ser. No. 472,868**

**Claims priority, application Germany, May 24, 1973, 2326525**

**Int. Cl.² F41D *11/24***

**U.S. Cl. 89—129 B** **25 Claims**



1. In an automatic shoulder arm having a stock; a receiver formed in the stock; a barrel longitudinally movably supported in the stock for executing a sliding motion between forward and rearward limit positions; a bolt assembly mounted on the barrel and being displaceable with respect to the barrel in the longitudinal direction thereof; gas operated action for moving the bolt assembly rearwardly with respect to the barrel upon firing a shot; a trigger mechanism dispoded in the receiver; a cartridge feeding device for introducing a new cartridge into the barrel upon firing a shot; spring means for urging said barrel and said bolt assembly in a direction opposing the force exerted by the gas operated action and recoil effect; the improvement comprising means coupled to said barrel, said bolt assembly, said gas operated action, said trigger mechanism and said cartridge feeding device for firing a plurality of successive shots while said barrel is in successive intermediate positions between said limit positions during its rearward travel.

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**4,024,793**

## ENERGY ABSORBING DEVICE AND DETENT FOR CONSTANT RECOIL SLIDE

**Edward R. Larrison, and Ray O. Reade, both of Davenport, Iowa, assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Oct. 8, 1975, Ser. No. 620,601**

**Int. Cl.² F41D *11/12***

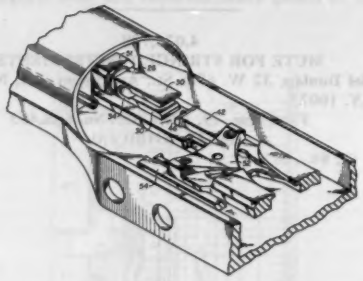
**U.S. Cl. 89—135** **5 Claims**

1. A clamp and wedge attachment between relatively fixed and moving components for releasably maintaining said components in fixed relationship until subjected to overriding forces,

said relatively fixed and moving components being a gun receiver and an operating slide for chambering cartridges,

said clamp having a pair of spaced tines between which said wedge frictionally moves as said slide moves forwardly to battery position,

said tines having inner tapered surfaces for continuously contacting said wedge when said wedge is inserted therebetween,



said clamp having a base to which said tines are connected, said tines having a reduced portion adjacent said base forming a flexure spring opening and allowing said tines to snap tightly closed on said wedge.

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**4,024,794**

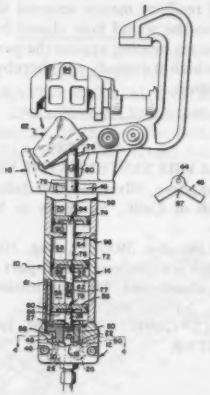
## PNEUMATICALLY OPERATED CABLE-SLITTING TOOL

**Daniel Baker Grubb, Hummelstown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Feb. 2, 1973, Ser. No. 329,248**

**Int. Cl.² F15B *11/18***

**U.S. Cl. 91—189 A** **3 Claims**



1. A pneumatic tool, comprising:

a work-performing assembly;

a piston assembly comprising three, tandemly arranged, interconnected pistons disposed within a cylindrical casing comprising three, tandemly arranged piston chambers;

first means for connecting said work-performing assembly to said piston assembly;

second means for supplying pressurized gas for actuating said piston assembly and said work-performing assembly to three, distinct, separate positions;

third means for selectively actuating said second means for supplying pressurized gas such that said pressurized gas acts upon and drives one of said pistons when actuating said assembly to a first position and acts upon and drives

all of said pistons when actuating said assemblies to a third position,

fourth means for urging said piston assembly to a second position intermediate said first and third positions,

said second means for supplying pressurized gas including a first conduit means leading from a pressurized gas source, a second conduit means leading from said first conduit means to a lower portion of said first piston chamber, a third conduit means disposed within said first means for connecting said work-performing assembly to said piston assembly, said third conduit means leading from said first piston chamber to said second and third piston chambers, a fourth conduit means leading from said first conduit means to an upper portion of said first piston chamber, and pressurized gas actuated valve assemblies for opening and closing said second and fourth conduit means, wherein said pressurized gas normally actuates said valve assemblies to their respective closed positions thereby closing said second and fourth conduit means whereby the piston and work-performing assemblies are actuated to said second position by said fourth means.

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## 4,024,795
## VEHICLE BRAKE ACTUATING SYSTEMS

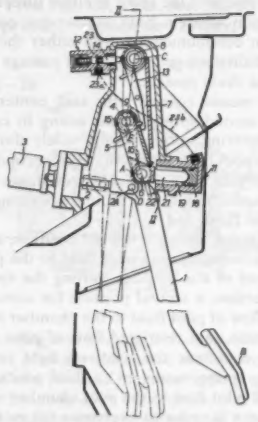
**Patrick Frank Sawyer, Birmingham, England, assignor to Girling Limited, Birmingham, England**

**Filed Oct. 31, 1975, Ser. No. 627,838**

**Claims priority, application United Kingdom, Nov. 8, 1974, 48509/74**

**Int. Cl.² F15B** *9/10, 13/10*

**U.S. Cl. 91—384** **13 Claims**



1. A power assisted pedal assembly comprising a lever pivotable about a fixed point, a brake pedal, a link having a first pivotal connection at one end with said lever and a second pivotal connection at the other end with said brake pedal, an actuating member adapted for connection to brake operating means and having a connection with said brake pedal intermediate the ends of said brake pedal whereby said brake pedal can apply a force to said actuating member along a predetermined line of action, and a power assisting means operable in response to movement of said brake pedal to apply an assisting force to said brake pedal said power assisting means having a force-transmitting member which is separate from said actuating member and which is in force-transmitting engagement with said lever and said link in the region of said line of action of the force applied to said actuating member by said brake pedal and so that said brake pedal, link and lever pivot about said fixed point when said power assisting means is operative, said pedal having a second pivot point intermediate said fixed point and said connection between said lever and said actuating member and means causing said pedal to pivot about said second point upon failure of said power assisting means.

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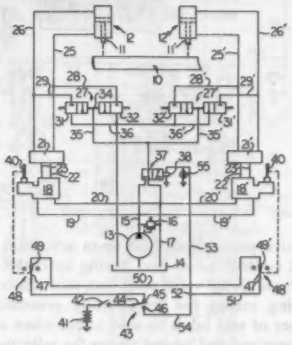
## 4,024,796
## FLOAT CONTROL ELECTRICAL CIRCUIT FOR A BLADE

**Michael R. Theobald, Princeville, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Sept. 24, 1975, Ser. No. 616,211**

**Int. Cl.² F15B** *11/16, 13/043*

**U.S. Cl. 91—411 R** **20 Claims**



1. In a system having a work tool adapted to be mounted on a vehicle, a doubleacting cylinder operatively connected to said work tool for selectively moving the same, a pressurized fluid source, a first control valve connected between said cylinder and said source, said first control valve having a manually operable handle with head end, rod end and neutral positions for communicating fluid from said source through said first control valve to the head or rod ends of said cylinder when said handle is in head end or rod end positions, respectively, and for preventing fluid flow through said first control valve when said handle is in neutral position, a normally closed second control valve connected between said cylinder and said source for exhausting fluid simultaneously from both the head and rod ends of said cylinder when said second control valve is open, solenoid means, and means operatively associated with said solenoid means and said second control valve for opening said second control valve upon energization of said solenoid means, the improvement comprising:

a. a source of electrical potential,

b. a manually operable switch means having a closed position,

c. means for electrically connecting said source of electrical potential to said solenoid means to energize said solenoid means in response to movement of said manually operable switch means to closed position,

d. means responsive to movement of said manually operable handle from neutral position for opening the electrical connection established by said means (c) from said source to said solenoid means.

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## 4,024,797
## SPRING CENTERED BALANCED RESOLVER VALVE

**Howard L. Johnson, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Oct. 28, 1975, Ser. No. 626,423**

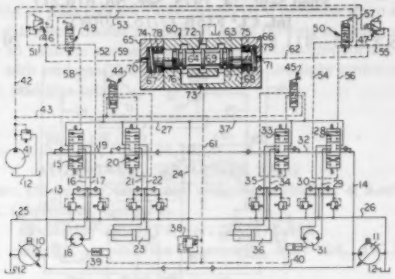
**Int. Cl.² F15B** *11/16, 13/08*

**U.S. Cl. 91—412** **3 Claims**

1. A hydraulic system comprising in combination a source of pressurized hydraulic fluid, a plurality of hydraulic motors, a plurality of control valves for directing fluid from said source to said motors, means for actuating said control valves to cause said control valves to transmit said fluid to selected one

of said motors, a dual-stage pressure responsive relief valve communicating with said source for said system for normally establishing a first pressure for said system and for establishing a second different pressure for said system in response to pressurization of a relief valve pilot line, communicating therewith further comprising:

a balanced resolver valve having a first inlet connected to receive pressurized fluid upon actuation of a first of said control valves and having a second inlet connected to



receive pressurized fluid upon actuation of a second of said control valves and having an outlet communicated with said relief valve pilot line, said resolver valve further having means for transmitting pressurized fluid from either of said inlets to said outlet when only one inlet is pressurized and having means for relieving pressure from said outlet when both of said inlets are pressurized and for preventing simultaneous communication of said inlets with said outlet.

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**4,024,798**

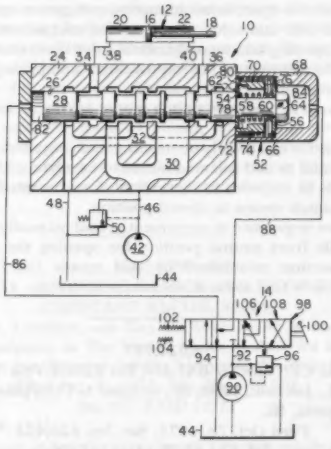
## CONTROL VALVE PROVIDING TWO SPEED OPERATION FOR A MOTOR

**Lawrence F. Schexnayder, Joliet, and Wayne A. Peterson, Washington, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed May 1, 1975, Ser. No. 573,683**

**Int. Cl.² F15B** *11/08, 13/042*

**U.S. Cl. 91—436** **2 Claims**



1. A pilot operated control valve system for effecting two speed operation of a hydraulic jack in a first direction and also for effecting one speed operation of the jack in the opposite direction, the hydraulic jack being of conventional type and including a cylinder, a piston movable therein, a rod integrally formed with said piston and extending outwardly therefrom, said piston arranged to divide the cylinder into a head end and a rod end, the piston having a greater effective area exposed relative to the head end of the jack as compared to its rod end, the pilot operated control valve system comprising

a hydraulic pump

a sump,

a control valve body defining a bore, an inlet passage for communicating the pump with the bore, at least one drain passage for communicating the bore with the sump, and two service passages for respectively communicating the bore with the head and rod end of the jack,

a spool being movably arranged within the bore and forming pilot actuating chambers at either end thereof,

the spool being longitudinally movable in its opposite direction toward a sole one operating position to communicate the inlet passage with the rod end of the jack through one of the service passages and to communicate the drain passage with the head end of the jack through the other service passage, the spool also being movable in its first direction by a discrete distance toward a first operating position to communicate the inlet passage with the head end of the jack through the other service passage and to simultaneously communicate the drain passage with the rod end of the jack through the one service passage, the spool being further movable in its first direction an additional discrete distance within the bore toward a second operating position to maintain communication between the inlet passage and the head end of the jack while also communicating the rod end of the jack with the inlet passage by means of the one service passage,

centering spring means for providing relatively light resistance to movement of the spool in either direction from a neutral position wherein both the service passages are blocked from communication with either the inlet passage or the drain passage and the inlet passage is communicated to the drain passage,

second spring means coaxial with said centering spring means, said second spring means acting in cooperation with said centering spring means solely during movement of the spool between its first and second operating positions for providing increased resistance to movement of the spool toward its second operating position,

a source of pilot fluid, and

a pilot control valve having a neutral position, a first pilot position for communicating pilot fluid to the pilot chamber in one end of the bore for shifting the spool in said opposite direction, a second position for communicating a restricted flow of pilot fluid to the chamber in the other end of the bore, said restricted flow of pilot fluid being sufficient to overcome the relatively light resistance of the centering spring means and a third position to communicate full pilot flow to the pilot chamber in the other end of the bore in order to overcome the relatively high resistance of the second spring means acting in cooperation with said centering spring means.

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**4,024,799**

## AXIAL-PISTON MACHINE WITH IMPROVED BEARING ARRANGEMENT

**Franz Forster, Muhlbach, Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Germany**

**Filed Mar. 14, 1975, Ser. No. 558,273**

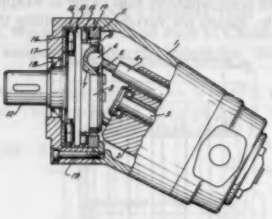
**Claims priority, application Germany, Mar. 15, 1974, 2412619**

**Int. Cl.² F01B** *13/04*

**U.S. Cl. 91—499** **6 Claims**

1. In an axial-piston machine comprising a housing, a cylinder drum rotatable in said housing about a first axis and having a plurality of pistons reciprocable parallel to said axis, a shaft journaled in said housing for rotation about a second axis inclined to said first axis, a drive flange in said housing secured to said shaft and lying in a plane perpendicular to said second axis and inclined to said first axis, said pistons

reacting via piston rods directly against said drive flange, the improvement which comprises bearing means in said housing acting directly upon said drive flange and taking up all of the radial and axial forces thereon, said bearing means including two oppositely directed axially effective roller



thrust bearings acting upon opposite sides of said drive flange and reacting against said housing, said axially effective bearings being applied against said drive flange under axial prestress; and

a spring acting upon one of said axially effective bearings for applying said prestress to said axially effective bearings and said drive flange.

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**4,024,800**

## ACTUATING AND BRACING JACK

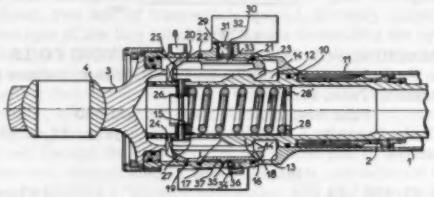
**Jean Masclet, Paris, France, assignor to Messier Hispano, Montrouge, France**

**Filed Feb. 25, 1975, Ser. No. 552,777**

**Claims priority, application France, Mar. 27, 1974, 74.10439**

**Int. Cl.² F15B *15/26***

**U.S. Cl. 92—26** **7 Claims**



1. An actuating and bracing jack comprising a cyliner and a rod which are pivotally connected at their free ends to a fixed member and to a movable member respectively, said cylinder including at least one of its extremities, at at least one internal longitudinal resilient catch member, said rod including a projection capable of coming into engagement behind said catch member, said cylinder being provided at least said one of its extremites with an enlarged cylindrical chamber of limited length, a displaceable locking device in said enlarged chamber, and means for displacing said locking device in said enlarged chamber by said rod, upon retraction movement thereof, to a first position in which said catch member is firmly applied against said projection, said locking device being displaceable in the opposite direction in said enlarged chamber in the cylinder under the action of an actuating fluid, to a second position in which the catch member is freed, said rod having one end with a threaded recess, a hollow end member having one end threaded into said recess, rotary bearing means between the other end of the end member and the associated movable member, and means in said hollow end member for taking up clearance between said one end of the rod and said hollow end member, comprising two tubular compression members in the hollow end member, at least two conical expansion washers gripped between said tubular compression members, a first of said tubular members abutting against the bottom of the hollow of said end member, the second of said tubular members being axially displaceable with respect to said first tubular member for compressing the expansion washers, and a draw member threadably engaged in said second tubular member while freely traversing the said first tubular member.

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**4,024,801**

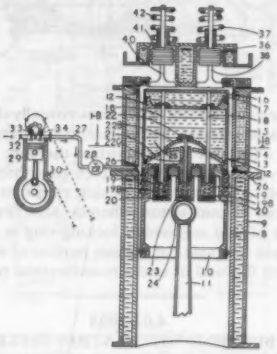
## EXTENDED INSULATED HOT HEAD PISTON WITH EXTENDED INSULATED HOT CYLINDER WALLS

**Perry David Hudson, Corpus Christi, Tex.**

**Division of Ser. No. 74,703, Sept. 23, 1970. This application Oct. 14, 1971, Ser. No. 189,153**

**Int. Cl. F16j *1/00*; F16l *59/00***

**U.S. Cl. 92—86.5** **7 Claims**



1. In combination, a reciprocating piston engine, designed to use a hot pressure fluid medium, comprising a main power piston having a head and a skirt including piston seal rings thereon, a cylinder supporting said main power piston for reciprocation therein, a cylinder extension supported above said cylinder, the inside diameter of said cylinder extension being slightly larger than the inside diameter of said cylinder, a jacket of insulation surrounding said cylinder extension, a pressure holding cylinder extension surrounding said jacket of insulation, a piston extension movable relative to said main piston, said piston extension having a slightly smaller outside diameter than the outside diameter of said main power piston, means for securing said piston extension to said main power postion to provide for said relative movement, said means comprising at least one opening in said main power piston head, at least one bolt means secured to said piston extension and extending through said opening, a bolt nut means secured to the end of said bolt means extending through said opening, a spring biasing means acting on said bolt nut means, and a pressure sealing cap means removably secured to said opening and securing and covering said bolt means end, said nut means, and said spring biasing means to provide a pressure tight joint.

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**4,024,802**

## HYDRAULIC PISTON AND ROD ASSEMBLY

**James A. Koppa, Antioch, Ill., assignor to International Harvester Company, Chicago, Ill.**

**Filed Nov. 6, 1975, Ser. No. 629,815**

**Int. Cl.² F16J *1/12***

**U.S. Cl. 92—255** **2 Claims**

1. A piston and rod assembly for use in a hydraulic cylinder comprising:

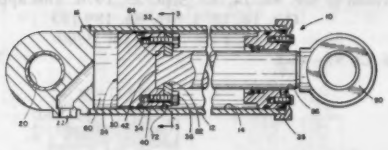
a piston rod having a circumferential recess spaced from one end thereof

said recess having a first flat wall adjacent said one end and said piston rod one end having a flat surface

a piston having a plurality of threaded apertures and a blind

bore recess with a flat base in an external flat bottom portion of said piston extending partway through the piston for receiving said piston rod with said flat surface of said one end of said piston rod abutting the flat base of said blind bore recess p1 the dimensions of said blind bore recess being virtually the same as the dimensions of said piston rod one end

a segmented locking ring of rectangular cross section, having a plurality of apertures therethrough, positioned in the circumferential recess of said piston rod;



said locking ring having dimensions virtually the same as the dimensions of said circumferential recess and further having a first flat surface portion thereon;

a plurality of attaching bolts which pass through the apertures of said segmented locking ring into the threaded apertures of said piston whereby said first flat surface portion of said segmented locking ring is held in direct abutment with said flat bottom portion of said piston and said first flat wall of said circumferential recess.

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**4,024,803**

**BUILDING VENTILATION SYSTEM**

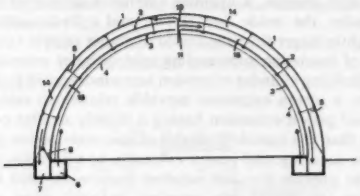
**Josef Linecker, Rosengasse 5, Nattighofen, Austria (A 5230)**

**Filed May 29, 1975, Ser. No. 581,798**

**Claims priority, application Austria, May 31, 1974, 4554/74**

**Int. Cl.² F24F** *13/00*

**U.S. Cl. 98—33 R** **8 Claims**



1. In a building having a ceiling comprised of spaced webs of flexible material defining spaces therebetween; an innermost one of the webs enclosing an air-filled chamber of the building, the air in the chamber being under superatmospheric pressure; and the innermost web defining openings at an upper region of the ceiling in communication with the chamber and one of the spaces whereby air from the chamber is received in the one space and passes therethrough; and means for returning the air to the chamber at a lower region after it has passed through the one space, the air passing through the space and being returned to the chamber in a closed cycle.

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**4,024,804**

**ROTARY BALING MACHINE WITH TWINE FEEDING MECHANISM AND ARTICULATED DRIVE ASSEMBLY**

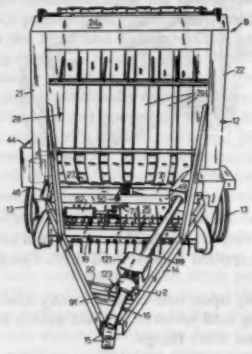
**Darwin M. Hanson, West Bend, Wis., assignor to Gehl Company, West Bend, Wis.**

**Filed Nov. 17, 1975, Ser. No. 632,269**

**Int. Cl.² B65B** *13/18;* **A01D** *39/00*

**U.S. Cl. 100—5** **8 Claims**

1. A rotary baling machine for forming large cylindrical bales of cut crop material, wherein said baling machine is operably pulled by a towing vehicle and includes an elongated bale forming zone for receiving cut crop material and for rotatably forming said material into an elongated large cylindrical bale and for rotating said bale, said baling machine including a twine feeding mechanism comprising a pivotable twine feeding tube having a free end swingably movable for controllably feeding twine into said bale forming zone along the length of said zone whereby said twine is wrapped around said rotating bale, means for variably controlling the position



of said free end and for controlling the amount of twine wrapped around said bale, and means for cutting said twine including a shiftable blade support means and a cutting blade supported by said shiftable blade support means for shiftable movement with said blade support means for engaging said twine to cut the latter, and said blade support means being shiftable by said pivotable twine feeding tube to thereby cause said blade to engage and cut said twine.

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**4,024,805**

**MACHINE FOR COMPACTING AND TYING COILS**

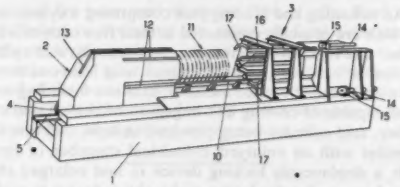
**Jean Emile Glasson, Cormeilles-en-Parisis, France, assignor to Botalam, Paris, France**

**Filed Nov. 25, 1975, Ser. No. 635,040**

**Claims priority, application France, June 12, 1974, 74.40018**

**Int. Cl.² B65B** *13/04*

**U.S. Cl. 100—12** **4 Claims**



1. A machine for compacting and tying coils comprising: a tying unit; a fixed supporting surface on said tying unit; a compacting unit having a movable supporting surface, said compacting unit being mounted for movement towards said tying unit for compacting a coil between said fixed and said movable supporting surfaces; means for supplying tying wire to said tying unit; a plurality of wire guide channels on said tying unit in cooperative relationship with said means for supplying tying wire and adapted to close around the compacted coil for guiding the tying wire around the compacted coil; a plurality of pairs of retractable rollers disposed on said compacting unit adjacent said movable supporting surface, each of said pairs of retractable rollers being positioned in cooperative relationship with each of said plurality of guide channels and arranged to bear against the sides of the com-

pacted coil to support the tying wire while the wire is pulled across the coil; and twisting means for tying the free ends of each tie after the tying wire has been pulled across the compacted coil.

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**4,024,806**

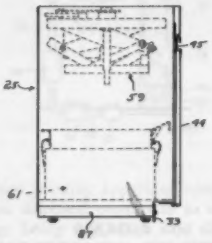
## TRASH COMPACTOR

**Charles B. Weeks, Boston, and Paul V. Choate, Milton, both of Mass., assignors to Norris Industries, Inc., Los Angeles, Calif.**

**Continuation-in-part of Ser. No. 515,675, Oct. 17, 1974, abandoned. This application Feb. 18, 1976, Ser. No. 659,126**

**Int. Cl.² B30B *15/22***

**U.S. Cl. 100—52** **15 Claims**



**1.** A compactor for compacting trash in a receiver, said compactor comprising a housing including an upper portion provided with structure having a central transverse support, an intermediate throat, a bottom portion for a receiver and of a cross sectional area greater than that of the throat, and a door permitting access to said throat and said bottom portion, a trash compacting head dimensioned to pass through said throat, two sets of transversely spaced, pivotally connected linkages of the lazy tongs type, means connecting the uppermost pair of links of both sets to said structure for movement towards and away from each other, and the lowermost links having their lower ends within the head, means pivotally connecting said lower ends thereto, means pivotally interconnecting the two sets of links and including a cross rod which extends through the centers of the uppermost pair of links of the two sets, vertical screws between said sets, one adjacent each set and having a threaded connection with said cross rod and with its upper end extending through and rotatably supported by said transverse support, and a drive attached to said supporting structure and including a reversible motor and members rotated by said motor, one member for each screw and fixed on the upper end thereof, said drive operable to effect the turning of the screws together in one direction to unfold the linkage and in the other direction to fold it thereby to reciprocate said head between an inoperative position adjacent the upper end of said throat and the lower ends of said screws, and an operative position within said bottom portion, said head including walls which at least at the front are of a height preventing the entrance of trash thereabove when said head is in said inoperative position.

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**4,024,807**

## PRESS

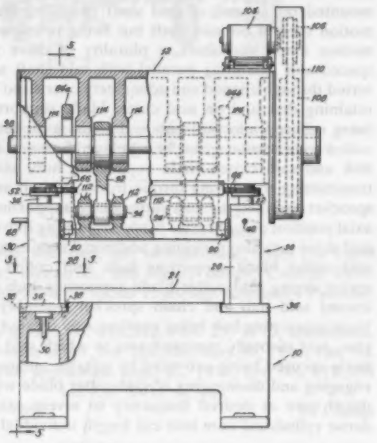
**Douglas E. Karsen, Three Rivers, Mich., assignor to Weldun International, Inc., Bridgman, Mich.**

**Filed Jan. 2, 1976, Ser. No. 646,058**

**Int. Cl.² B30B *15/04***

**U.S. Cl. 100—53** **37 Claims**

**37.** In a press having a crown member, a complementary base member, operative press ram means operating between said crown member and base member to apply work pressure to a workpiece in direct or offset loading positions, and support and tiedown means adapted rigidly to hold said crown member at a predetermined working station with respect to said base member, the improvement in which the support and tiedown means comprises hollow columns which comprise pressure fluid-actuated means, each comprising a cylinder and cooperating piston and piston rod and cylinder head and stop means for limiting the movement of said crown member toward said base member, said pressure fluid-actuated means having each cylinder rigidly a part of one of said members and the free end of each piston rod rigidly affixed to the other of



said members, and being integrated for concurrent and equal action, and cooperating pressure fluid inlet and outlet means and pressure fluid controls for effectively altering the pressure on either side of the pistons, whereby when the piston rods are actuated toward their extended position, the crown member is moved away from the base member and when the piston rods are actuated toward their retracted position, the crown member is moved toward the base member and held in a fixed rigid position relative to the base member.

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**4,024,808**

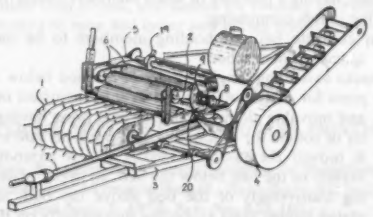
## CUTTING MECHANISM FOR ROTARY COMPACTING MACHINES FOR FIBROUS MATERIAL

**Joseph Molitorisz, 624 81st Ave. NE., Bellevue, Wash. 98004**

**Continuation-in-part of Ser. No. 327,678, Jan. 29, 1973, Pat. No. 3,899,964. This application Aug. 18, 1975, Ser. No. 605,644**

**Int. Cl.² B30B *3/04*; B26D *1/56***

**U.S. Cl. 100—89** **2 Claims**



**1.** A cutting mechanism to severe the continuous dense cylindrical core formed from fibrous material in rotary compacting machines using the rolling-compressing technique, into desired length individual rolls, said cutting mechanism being positioned at the discharge exit of the core forming channel of said rotary compacting machines, comprising; a shaft which is positively secured to a pivotally mounted arm, said shaft being restricted from rotational motion about its

own axis, and also being restricted from any motion relative to said pivotally mounted arm, a cutter blade fixedly mounted on a cutter blade supporting hub, said supporting hub journally mounted on said shaft providing free rotational and axial movement of said blade supporting hub with respect to said shaft, a hub and chain sprocket assembly journally mounted on said shaft allowing free rotational motion for said hub and chain sprocket assembly on said shaft but being restricted from axial motion along shaft, a retaining disk journally mounted on an end of said shaft providing free rotational motion thereof on said shaft but being restricted from axial motion along said shaft, a plurality of drive pins radially spaced and extending parallel with said shaft and being inserted through aligned and adequately over sized holes on said retaining disk and on said cutter blade supporting hub and being secured into said hub and chain sprocket assembly, a coiled compression spring being placed between said retaining disk and said cutter blade supporting hub, said drive pins transmitting the driving torque from said hub and and chain sprocket assembly to said cutter blade supporting hub at any axial position of said cutter blade supporting hub on said shaft, said drive pins also providing additional stabilizing support for said cutter blade supporting hub, said coiled compression spring urging said cutter blade supporting hub on said shaft toward said hub and chain sprocket assembly, said cutter blade supporting hub being continuously rotated by said drive pins, said pivotally mounted arm to which said shaft is positively secured being activated by suitable means to cause the engaging and disengaging of said cutter blade with said cylindrical core at desired frequency to severe said continuous dense cylindrical core into cut length individual rolls.

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**4,024,809**

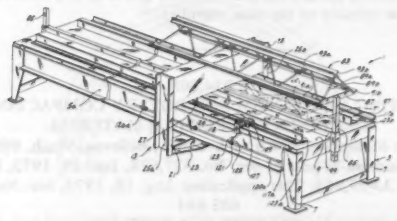
## APPARATUS FOR FABRICATING WOOD STRUCTURES

**Walter G. Moehlenpah, 9906 Old Warson Road, Ladue, St. Louis County, Mo. 63124**

**Filed Oct. 14, 1975, Ser. No. 622,448**

**Int. Cl.² B30B** *1/32*

**U.S. Cl. 100—100** **4 Claims**



1. Apparatus for fabricating wood structures, such as trusses, having a plurality of wood members nailed together by nailing plates comprising:

an elongate bed for holding members to be nailed with space below the bed;

tracks extending longitudinally of the bed below the bed;

a press for driving nailing plates into members on the bed and movable along the tracks, said press having a plurality of rollers for supporting said press on said tracks as it is moved therealong, a lower platen extending transversely of the bed below the bed, an upper platen extending transversely of the bed above the bed, said upper platen having arms extending downwardly on the outside of said bed below said tracks and a base extending between the lower end of said arms below said bed, and power means including at least one hydraulic cylinder unit interposed between said base and said lower platen operable to move the upper platen down from a raised position above the bed into engagement with nailing plates on the members on the bed and to move the lower platen up into engagement with the bottom of the bed;

means for moving the press from place-to-place along the tracks, the press being subject upon acceleration and deceleration as it is moved to longitudinal forces above and below the level of said rollers; and

a hydraulic pressure system for said hydraulic cylinder unit and a tank containing a supply of hydraulic fluid for said system, said system being mounted on said base below said rollers and said tank being carried by the press above the level of the rollers whereby the center of gravity of the press is generally at the level of said rollers with the resultant inertial moments of the press and the hydraulic system below the level of the rollers and with the resultant inertial moments of the press and said tank and the fluid therein above the level of said rollers being substantially equalized so as substantially to eliminate the tendency of the press to rock on said rollers upon acceleration and deceleration of the press.

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**4,024,810**

## LIQUID SETTLING AND PRESS CONTAINER

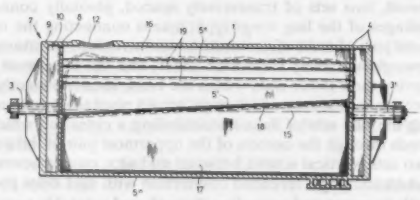
**Oskar Braun, Wilhelmstrasse 41, 614 Bensheim, Bergstrasse, Germany**

**Filed Oct. 6, 1975, Ser. No. 619,661**

**Claims priority, application Germany, Oct. 31, 1974, 2451756; Nov. 28, 1974, 2456247**

**Int. Cl.² B30B** *5/02, 9/22*

**U.S. Cl. 100—116** **3 Claims**



1. A liquid settling and pressing tank for materials containing liquids, such as grapes, fruit mash and similar materials, said tank having elongated shape with its maximum longitudinal dimension being at least several times its maximum lateral dimension with said tank mounted horizontally for rotation about its longitudinal dimension,

a liquid collecting section located at one end of said tank and separated from the remainder of said tank by a laterally extending wall with said wall having a perforate portion and an imperforate portion,

an elastic membrane located in said tank and extending generally along the length of said tank from said laterally extending wall and separating the tank into a material section and a pressurized fluid section,

said material section communicating with said liquid collecting section through said perforated portion of said laterally extending wall,

said pressurized fluid section being separated from said liquid collecting section by said imperforate portion of said laterally extending wall,

an opening in said tank for introducing and removing said material from said material section,

an opening in said tank for introducing and removing said pressurized fluid, and

an opening in said tank into said liquid collecting section for removal of said collected liquid.

## 4,024,811
## HIGH SPEED PRINTING APPARATUS

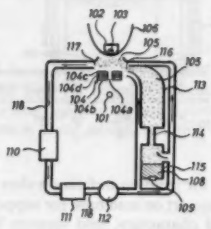
**Akinori Watanabe; Katsuhide Tanoshima, and Matsusaburo Noguchi, all of Tokyo, Japan, assignors to Oki Electric Industry Company, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 531,762, Dec. 11, 1974, abandoned. This application June 2, 1976, Ser. No. 691,996**

**Claims priority, application Japan, Dec. 20, 1973, 48-141816**

**Int. Cl.² G03G** *13/06*

**U.S. Cl. 101—1** **4 Claims**



**1.** A high speed printing apparatus comprising a printing sheet, electrodes disposed proximate to said sheet, a high electrical voltage being applied to said electrodes, charged ions passing between said electrodes and said printing sheet and toward said printing sheet, the rate at which said ions pass toward said printing sheet being controlled by the high electrical voltage applied to said electrodes, means for forming an ink mist and passing said ink mist through an aperture located proximate to said electrodes and toward said printing sheet, said ions passing through said ink mist to be deposited with ink particles of said ink mist onto said printing sheet for printing symbols, said means for forming said ink mist comprising an ink tank containing said ink, a plurality of resonators resonating within said ink tank, the improvement comprising a buffer storage means for storing said ink mist and pipe means connected between said ink tank and said buffer storage means, said pipe means comprising a cross-sectional area narrower than the cross-section areas of each of said ink tank and buffer storage means, said pipe means separating the process of forming the ink mist in said ink tank from said buffer storage means and said aperture to the effect of individual resonator elements of the ink mist passing toward said printing sheet.

## 4,024,812
## REMOVABLE NUMBERING AND IMPRINTING DEVICE FOR SHEET-FED OFFSET MACHINES

**Hans-Georg Jahn, Wiesloch, Germany, assignor to Heidelberger Druckmaschinen Aktiengesellschaft, Heidelberg, Germany**

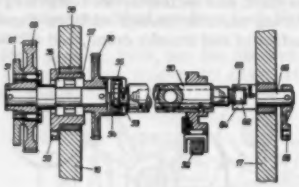
**Continuation of Ser. No. 355,739, April 30, 1973, abandoned. This application Sept. 30, 1975, Ser. No. 618,220**

**Claims priority, application Germany, May 2, 1972, 2221343**

**Int. Cl.² B41L** *49/02*

**U.S. Cl. 101—76** **6 Claims**

**1.** In a sheet-fed offset machine, having a machine frame, cooperating printing, rubber and plate cylinders, an inking mechanism for the plate cylinder and a sheet delivery spaced from the rubber cylinder, a numbering and imprinting device removably mounted in the space between the rubber cylinder and the sheet delivery and cooperating with the printing cylinder, the removable numbering and imprinting device comprising an intermediate shaft portion carrying a plurality of numeral units, means for removably mounting said intermediate shaft portion on a numbering shaft, carried by the machine frame, means detachably mounting said numeral units on said intermediate shaft portion, and an inking mechanism mounted on said machine frame and operable to ink said numeral units, said inking mechanism being a self-contained, structural unit readily removable from said frame separately from said numbering shaft and said numeral units, whereby removal of said



inking mechanism from said machine frame provides ready access to said numbering shaft and said numeral means.

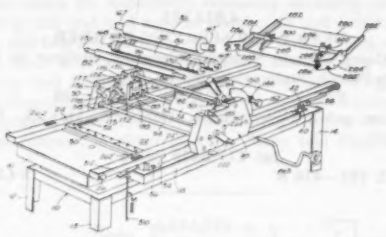
## 4,024,813
## CARD PRINTING MACHINE

**Carl G. Thiene, deceased, late of Rosemead, Calif. (by Carol M. Thiene, executrix), and Henry Smith, Canoga Park, Calif., assignors to Reynolds Printasign Company, Pacoima, Calif.**

**Continuation of Ser. No. 418,242, Nov. 23, 1973, abandoned, which is a division of Ser. No. 258,186, May 30, 1972, Pat. No. 3,804,014. This application Sept. 22, 1975, Ser. No. 615,350**

**Int. Cl.² B41F** *31/00*

**U.S. Cl. 101—269** **14 Claims**



**1.** A printing machine having a type holding bed with rails extending along the sides of the bed, a carriage movable along the rails, the carriage having side plates and carrying at least one inking roller mounted about a shaft for applying ink on said bed and an impression roller between the plates to be movable with the carriage, the improvement comprising eccentric cam means rotatably mounted on the side plates; the inking roller having shaft ends resting on the peripheries of said eccentric cam means, and means for rotating said eccentric cam means to raise and lower said inking roller, relative to the bed.

## 4,024,814
## TRANSFER DRUM IN SHEET-FED ROTARY PRINTING PRESSES

**Willi Becker, Bammental, Germany, assignor to Heidelberger Druckmaschinen Aktiengesellschaft, Heidelberg, Germany**

**Filed Nov. 3, 1975, Ser. No. 628,102**

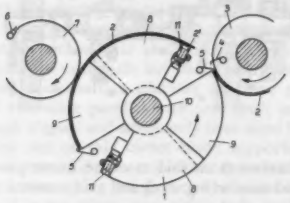
**Claims priority, application Germany, Nov. 2, 1974, 2452096**

**Int. Cl.² B41F** *1/30*

**U.S. Cl. 101—410** **18 Claims**

**1.** In a sheet-fed rotary printing press, a transfer drum assembly comprising a rotatable transfer drum formed with a sheet-supporting peripheral surface having at least two ends circumferentially spaced about; said transfer drum, a gripper device carried by said transfer drum for gripping the leading

edge portion of a sheet being transferred, and a suction device secured to said transfer drum at one of said ends of said peripheral sheet-supporting surface for gripping the trailing edge portion of the sheet, said suction device comprising a plurality of suckers having movable suction surfaces disposed in the peripheral surface of said transfer drum , said suction surfaces



being formed with suction orifices located therein, means for simultaneously moving each of said suction orifices in both an axial and circumferential direction relative to said peripheral surface so that a suction force applied through said orifices at the varying positions thereof simultaneously tensions the sheet in an axial and circumferential direction relative to said peripheral surface.

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**4,024,815**

## DEVICE FOR SPRAYING POWDER

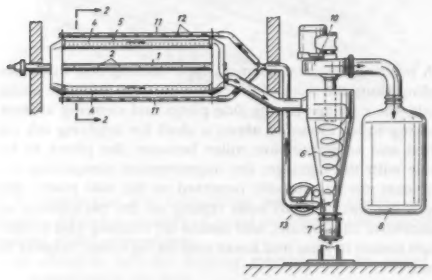
**Hans Georg Platsch, Stuttgart, Germany, assignor to Firm Albin Platsch, Stuttgart-Vaihingen, Germany**

**Filed Dec. 16, 1975, Ser. No. 641,348**

**Claims priority, application Germany, May 3, 1975, 2519831**

**Int. Cl.² B41F *23/06***

**U.S. Cl. 101—416 R** **5 Claims**



1. A device for spraying powder, more particularly for spraying powder on freshly printed sheets, comprising at least one powder supply conduit from which powder is sprayed by means of compressed air for the purpose of preventing the individual sheets from being smudged and the powder being drawn off by vacuum in a suction line, characterized in that means comprising a substantially rectangular frame structure provided with a plurality of branched, apertured ducts are arranged to straddle a series of nozzles which emit said spray powder to said sheets, said apertured ducts further including at least one further pair of inboard apertured ducts adapted to communicate with a source of vacuum and at least one pair of additional branched, apertured ducts outboard of said first named ducts, said outboard apertured ducts being adapted to emit a curtain of blast air which serves to return excess spray powder to a separator assembly.

**4,024,816**

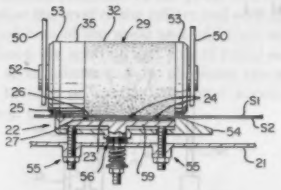
## INKING ROLLER AND APPARATUS AND METHOD FOR PRINTING USING SUCH ROLLER

**Leland E. Williams, Centerville, Ohio, and James O. Griffith, Three Rivers, Mich., assignors to Dayco Corporation, Dayton, Ohio**

**Filed Feb. 5, 1976, Ser. No. 655,342**

**Int. Cl.² B41F *3/04***

**U.S. Cl. 101—426** **20 Claims**



7. An apparatus for printing indicia on sheet material comprising, a base, a support on said base for supporting a printing plate having raised characters, said support having an elongated rail which receives an edge of said printing plate in abutting relation thereagainst, an inking roller, said inking roller having an outer cylindrical surface and comprising an inking portion defined by a tubular porous sintered mass of particles bonded together into a homogeneous reticulated open pore structure having pores throughout, said pores containing ink and being interconnected and forming continuous ink passages between said outer surface and an inner surface of said structure, said inking roller having a non-inking portion defined by an ink impermeable member disposed on said cylindrical structure and defining at least a part of said outer surface, said structure having an integral reduced diameter cylindrical portion at one end thereof, said member being in the form of a tubular sleeve having a cylindrical outside surface which defines said part of said outer surface, said sleeve being fixed to said reduced diameter cylindrical portion, said roller having substantially uniform deflection characteristics across its entire axial length, and means supporting said inking roller for rectilinear movement with said noninking portion being supported solely by said rail with only said sheet material interposed therebetween and said roller exuding ink from its inking portion on said sheet material in response to backup pressure exerted by said raised characters through said sheet material to print corresponding indicia thereon, said uniform deflection characteristics and action of said non-inking portion assuring inking of said sheet material free of both smearing and wrinkling thereof.

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**4,024,817**

## ELONGATED FLEXIBLE DETONATING DEVICE

**Brooke J. Calder, Jr., Solon; Robert J. Belock, Wellston, and Roger N. Prescott, Lyndhurst, all of Ohio, assignors to Austin Powder Company, Beachwood, Ohio**

**Filed June 2, 1975, Ser. No. 582,993**

**Int. Cl.² C06C *5/04*; F42D *1/04***

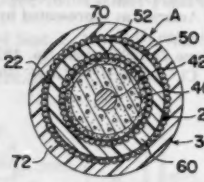
**U.S. Cl. 102—27 R** **24 Claims**

1. An elongated, flexible unitary detonating device of indeterminate length for detonating a selected explosive material within a bore hole, said detonating device including, in combination:

a. a detonating cord capable of detonating said selected explosive material when initiated while in direct contact with said selected explosive;

b. a flexible energy absorbing layer formed around and carried by said detonating cord, said energy absorbing layer being formed from an energy absorbent material and having a radial thickness sufficient to preclude detonation of said selected explosive material in direct

contact with said energy absorbing layer when said detonating cord is initiated; and,




c. a releasable layer means between said energy absorbing layer and said cord for allowing manual stripping of said energy absorbing layer from said detonating cord at any selected portion along said detonating cord.

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4,024,818

## STAB-INITIATED EXPLOSIVE DEVICE CONTAINING A SINGLE EXPLOSIVE CHARGE

**Calvin L. Scott, Washington, D.C., and Howard S. Leopold, Silver Spring, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Mar. 16, 1976, Ser. No. 667,816**
**Int. Cl.² C06C** *5/00, 7/00;* **C06B** *41/00*
**U.S. Cl. 102—27 R** **2 Claims**

1. A stab-initiating detonating or priming device comprising a container for housing an explosive charge, and a single explosive charge consisting of a uniform mixture of from about 90 percent to about 98 percent by weight of mercuric-5-nitrotetrazole and from about 2 percent by weight of tetracene housed within said container.

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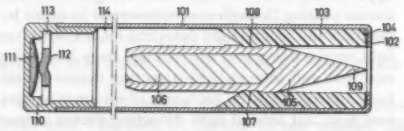
4,024,819

## CARTRIDGE FOR FIREARMS

**Hans-Ludwig Schirneker, Engelslit 10, Mohnesee-Vollinghausen, Germany**

**Filed Apr. 14, 1975, Ser. No. 567,834**
**Claims priority, application Germany, Apr. 13, 1974, 2418049**
**Int. Cl.² F42B** *5/02*
**U.S. Cl. 102—38** **2 Claims**



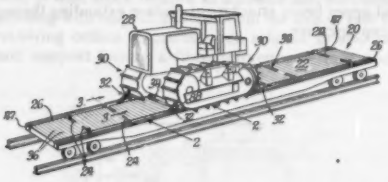

1. In a cartridge for firearms comprising, in combination, a hollow elongated cartridge case having a thin tubular wall, percussion means disposed at the rear end of the case, a projectile, and a bushing engageable with the inner wall of the case for supporting the projectile entirely within the case forwardly of the percussion means, the improvement wherein the front surface of the cap is bent radially inwardly to form an integral flange, and in which the front end of the bushing exhibits an inwardly and forwardly extending taper, the bushing being positioned in a forward portion of the case with the forward end of the taper abutting the radially inwardly bent flange of the case.

4,024,820

## LATERAL AND LONGITUDINAL ADJUSTABLE STOWABLE CHOKING SYSTEM

**Emil J. Hlinsky, Oak Brook, and Allen D. Siblik, Mundelein, both of Ill., assignors to MacLean-Fogg Lock Nut Company, Mundelein, Ill.**

**Filed June 12, 1975, Ser. No. 586,518**
**Int. Cl.² B60P** *7/08, 7/14;* **B61D** *45/00, 49/00*
**U.S. Cl. 105—368 R** **22 Claims**



1. In combination, a flatbed carrier having transverse and longitudinal sills undersupporting a flat deck, the top of said deck being characterized by at least one longitudinal track formed flush therein, and by plural transverse tracks formed flush therein at spaced locations therealong; plural lateral restraining apparatus each comprising a lateral load-engaging bearing plate extending into a respectively associated one of said transverse tracks and lateral positioning means for adjustably locating each said plate along a respectively associated one of said transverse tracks; plural reversible longitudinal restraining apparatus each comprising a restraining arm, a support member engaging said arm, and first and second anchor means for respectively releasably anchoring said restraining arm and said support member to said longitudinal track, said first and second anchor means further being operable to effect selective adjustment and positive locking of said arm and said member at selected positions therealong, said restraining arm and support member further characterized by the capability of assuming reversed positions to provide longitudinal restraint in either direction along said longitudinal track.

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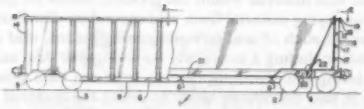
4,024,821

## UNIT TRAIN COAL CAR TENSION STRIPS TO PREVENT CAR BODY FROM TWIST

**Tunghan Yang, Munster, Ind., assignor to Pullman Incorporated, Chicago, Ill.**

**Filed Oct. 24, 1975, Ser. No. 625,606**
**Int. Cl.² B61D** *17/00*
**U.S. Cl. 105—406 R** **6 Claims**



1. In a railway car supported on spaced car trucks and including a body having sides and end walls and a transverse bolster beam at each end of the car connected to said sides and spaced longitudinally inward of an associated end wall, an improved car wall bracing means, comprising;

a pair of laterally crossed elongated braces provided for each end wall, each of said braces extending diagonally downward and longitudinally inward and substantially laterally across the car between one of said end walls and said associated bolster beam, and

each of said braces having an upper attachment portion securing said brace to an upper edge portion of its associated end wall, and a lower attachment portion securing

said brace to its associated bolster beam on the opposite side of the car,

said body having four upper corners defined by the side and end walls of the car, and

each of said corners having an overlying cap coupling adjacent side and end walls and including an inwardly extending cap flange couplable with the upper attachment portion of said elongated brace,

said cap flange having a downwardly longitudinally inward and laterally diagonal aperture therethrough, and

said upper brace attachment portion extending through said cap aperture.

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**4,024,822**

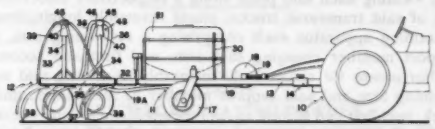
**PNEUMATIC SEEDER ASSEMBLY**

**Arthur Ross, Box 4, and Lawrence Preston Davey, Box 32, both of Antler, Canada**

**Filed Dec. 22, 1975, Ser. No. 643,076**

**Int. Cl.² A01C** *7/00, 15/04;* **B65G** *53/04*

**U.S. Cl. 111—34** **6 Claims**



1. In a pneumatic assembly for the deposition within the ground of particulate material such as seed grain, granular fertilizer and the like and operable by a source of power such as a tractor, said assembly including a material hopper carrying component detachably securable to the source of power, ground engaging wheels supporting said component, a seed drill assembly detachably connected to said hopper carrying component and ground engaging wheels supporting said seed drill assembly; the improvement comprising in combination a particulate material holding hopper on said component having an outlet therein, a main distributing head on said pneumatic assembly, means for pneumatically conveying material from said hopper to said main distributor head, at least one secondary distributor head on said pneumatic assembly, means for pneumatically conveying the material from said main distributor head to said secondary distributor head, a plurality of furrow opening means on the seed drill assembly for the deposition of said material within the ground, means for pneumatically conveying material from said secondary distributor head to adjacent each of said furrow opening means, said distributor heads including a concavely domed upper side, said material entering said distributor heads from the base thereof and means in said distributor heads to direct the material towards the center of said domed upper side, said distributor heads comprising a main body portion having a substantially truncated cone shaped configuration situated substantially vertically when in use, said domed upper side being situated on the narrower upper end of said main body portion, a base spanning the wider lower end of said main body portion, said means for pneumatically conveying material being connected centrally to said base, said means in said distributor heads for centering the material passing therethrough including at least one annular tapered ring formed within said main body portion, the cross section of said ring increasing in thickness from the lower side towards the upper side thus acting to funnel material towards the vertical axis of said main body portion and outlet means radially extending around the perimetrical wall of said domed upper side.

**4,024,823**

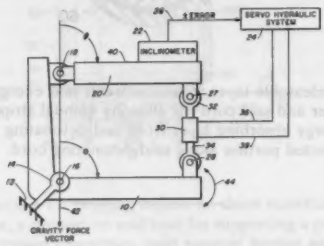
**AUTOMATIC BLADE ANGLE CONTROLLER SYSTEM**

**Carter J. Ward, Ventura; Kwang-Ta Huang, Port Hueneme, and George W. Byrd, Oxnard, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed June 24, 1974, Ser. No. 482,291**

**Int. Cl.² E02F** *3/76;* **G01C** *9/06*

**U.S. Cl. 172—4.5** **5 Claims**




1. An automatic blade level controller system utilizing the gravitational force vector comprising:

a. a support member;

b. a controlled member pivotally attached to said support member;

c. an opaque enclosure rigidly affixed to said controlled member, said opaque enclosure having a level reference position, thereby establishing a reference position for said controlled member depending upon the placement of said opaque enclosure with respect to said controlled member,

d. a closed, transparent manometer partially filled with an opaque liquid located inside said enclosure, said liquid forming two surfaces inside said manometer;

e. a pair of opaque floats floating respectively on the two surfaces of said liquid in said manometer each said float being shaped such that in combination with the liquid surface cohesive or tension effects each said float is centered in said manometer without touching the manometer wall thereby eliminating columb friction forces and providing linear viscous forces from couette flow between each said float and its respective manometer wall whereby undesirable hysteresis effects are eliminated, said floats having flat top surfaces.

f. a light source located inside the perimeter of said manometer;

g. a first and a second light detecting means located on opposite sides of said light source, light from said light source passing through said manometer in order to strike said first and second light detecting means, light from said light source being partially blocked from impinging upon said first and second light detecting means by said surfaces of said floats on each side of said manometer, each said first and second light detecting means outputting a direct current voltage level proportional to the amount of light impinging, thereon, each said light detecting means receiving an equal amount of light from said light source when said level sensing means is in said level reference position; and

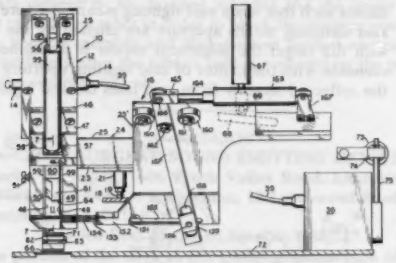
h. an error signal being generated by voltage differences when each said light detecting means receives different amounts of light from said light source, and

i. means connected between said support member and said controlled member and receiving said error signal for returning said controlled member to its reference position.

## 4,024,824
## SEWING MACHINE FEEDING AND CUTTING ATTACHMENT FOR ELASTIC STRIPPING

Frederick Haff, Jr., 161 Tanners Pond Road, Garden City, N.Y. 11530

Filed Sept. 5, 1975, Ser. No. 610,687
Int. Cl.² D05B *21/00*
U.S. Cl. 112—121.26 14 Claims



1. In apparatus for use with a sewing mahine to controllably elasticize circular parts of garments and the like and having stitch-forming means, a presser foot and work-feeding means for feeding the materials to be sewed past the stitch-forming means, said sewing machine and apparatus being adapted to sew a strip of first elastic material to the second material along the circumference thereof and adaptable for power operation, the improvement which comprises: an upright bracket forwardly disposed of the stitch-forming means, a sewing machine cover and means to lockably pivot said upright bracket to said sewing machine cover, said bracket having main and lateral arms, adjustable tensioning means for the said strip for varying stretch thereof and secured on said main arm, first actuating means for said tensioning means also secured to the upper part of said main arm, guide means secured to and disposed along said main arm therebelow for downward path of said strip, a guide throat for said strip spaced from and below said guide means and in substantial axial alignment therewith and leading and connected to the said presser foot, an initiating and returnable feed finger blade transversely engageable with said elastic material strip for movement and introduction of said strip through said guide throat to the presser foot and for takeup by the stitch-forming means, second actuating means operatively carrying said feed finger blade and secured to said main arm, reciprocable cutting means mounted on the lateral arm of said bracket for said strip, and third actuating means operatively connected to said cutting means and also secured to said lateral arm, said cutting being adapted to transversely sever said strip along said guide means during feeding to and sewing operation by the stitch-forming means.

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## 4,024,825
## SEWING MACHINE WORK SUPPORT AND FEED CONTROL

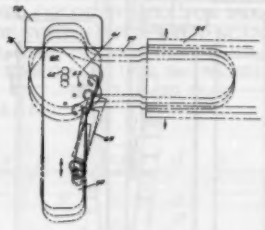
Robert B. Egtvedt, Comstock Park; John R. Den Bleyker, Holland, and Theodore C. Zwiep, Grand Rapids, all of Mich., assignors to Wolverine World Wide, Inc., Rockford, Mich.

Division of Ser. No. 525,737, Nov. 20, 1974, which is a division of Ser. No. 339,776, March 12, 1973, Pat. No. 3,871,306. This application Mar. 11, 1976, Ser. No. 665,818
Int. Cl.² D05B *21/00*
U.S. Cl. 112—121.12 3 Claims

1. An attachment kit for coverting a sewing machine having a throat plate, a lower oscillating feed dog, and an upper walking pressure foot into a pattern-following sewing machine, comprising:

a support table for replacing the conventional throat plate, said table having a receiving opening in central portions thereof, with said opening including transverse guide means;

stock feed and orienting means for replacing the conventional lower feed dog on the conventional oscillating crank of a sewing machine, and cooperable with a rotatable walking pressure foot, including a support reciprocable on said guide means, a stock feeding and orienting platform having a needle receiving orifice therein and pivotally attached to said support for reciprocation therewith to feed stock relative to a needle and for controlled pivoting with respect thereto about the axis of said needle receiving orifice to orient stock relative to said needle; said support having a fixed reference surface and said



platform having a reference surface cooperable with said fixed reference surface during movement of said platform toward said fixed reference surface to forcefully pivot said platform and stock thereon until said reference surfaces are fully engaged;

biasing means between said platform and said support arranged to bias said platform to a rotated position away from said fully engaged condition; and pattern sensing means on said platform adapted to limit the biased rotation of said platform in response to sensing of a pattern, whereby said pattern sensing means will allow said platform to pivot away from said fully engaged condition a controlled amount such that reverse forceful pivoting will rotate stock about said needle said controlled amount.

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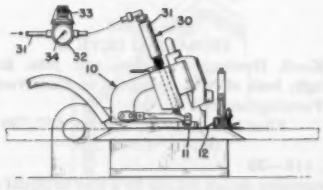
## 4,024,826
## TENSION ATTACHMENT FOR SEWING MACHINES

Edward P. Knight, Stokesdale, N.C., and Watson Bailey, Falkrik, Scotland, assignors to Blue Bell, Inc., Greensboro, N.C.

Filed Aug. 22, 1975, Ser. No. 606,757
Int. Cl.² D05B *29/02*
U.S. Cl. 112—235 5 Claims




1. A constant pressure tension attachment for a sewing machine having a fabric guide comprising; means on said sewing machine for guidably urging fabric along a direct path of travel, presser means displaceable between limits for exerting a force on the fabric as it travels along a directed path of travel, fluid means directly communicating witl said presser means for applying the limits of presser means displacement, said fluid means including an accumulator for said fluid means mounted on said sewing machine above said presser means.

4,024,827

## VESSEL RUDDER ASSEMBLY, PARTICULARLY A BALANCE TYPE PROFILE RUDDER WITH A FIN

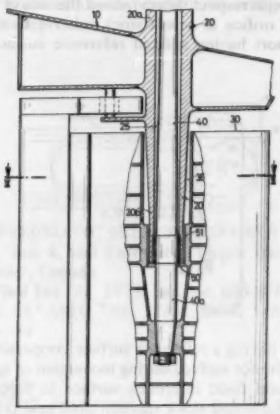
Willi Becker, Danziger Str. 22, 2000 Hamburg 1, Germany

Filed Dec. 19, 1975, Ser. No. 642,386

Claims priority, application Germany, Dec. 8, 1975, 2555098

Int. Cl.² B63H *25/06*

U.S. Cl. 114—162 4 Claims



1. A vessel rudder assembly, particularly for a balance type profile rudder with a fin, the assembly including a rudder stock bearing, a rudder shaft and a rudder blade, wherein the improvement comprises that said rudder blade having an upper end and a lower end with a recess extending downwardly from the upper end thereof, said rudder stock bearing being upright and having an upper end arranged to be fastened to the hull of a vessel and a lower end, said rubber stock bearing extending downwardly into the recess in said rubber blade with the upper end thereof located above said rudder blade and the lower end located within the recess in said blade, said rudder stock bearing having a tubular shape with said rudder shaft extending downwardly through said rudder stock bearing into said rudder blade with the lower end of said rudder shaft located within said recess in said rudder blade below the lower end of said rudder stock bearing, said rudder blade being suspended from said rudder shaft with the lower end of said shaft being rigidly joined to said rudder blade, and at least one rudder shaft bearing for said rudder shaft located within said rudder stock bearing in the portion thereof extending downwardly into said rudder blade.

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4,024,828

## SIGNALING DEVICE

Frank Knoll, Huntington Station, and John Robert Ryan, Wantagh, both of N.Y., assignors to East/West Industries, Inc., Farmingdale, N.Y.

Filed Dec. 4, 1975, Ser. No. 637,730

Int. Cl.² G08B *5/00*

U.S. Cl. 116—20 30 Claims

1. A signaling device for use by a user to signal a target with reflective sunlight, comprising:

A. sighting means for positionment between the user and target including:

1. a sighting plate, and

2. a sighting aperture extending through said plate to view the target,

B. signaling means for positionment between said sighting means and the user including:

1. a signaling plate,

2. a reflective substantially planar surface on one side of said plate positioned facing the target to reflect the sunlight thereto,

3. a signaling aperture extending through said plate to view the target, said sighting aperture and said signaling aperture are maintained in alignment such that the user can view the target and direct the reflections from the reflective surface to the target, and

4. alignment means comprising lines on said reflective surface adapted to provide a shadow on said sighting means such that when said sighting means aperture and said signaling means aperture are aligned by the user with the target the alignment means is positioned to coincide with the center of said sighting aperture and the reflected shadow from said lines on said signaling

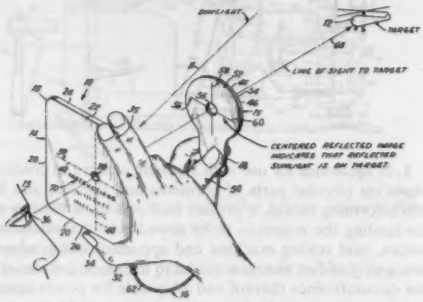

plate permits continuous monitoring to provide proper alignment such that maximum transmission of light from said reflective surface to the target in response to the movement of said signaling means is obtained,

C. reflected alignment means on said sighting means comprising matching lines contained on the surface of said sighting plate facing said signaling means to properly align said shadow on said sighting means with said sighting means aperture to provide said proper alignment, and

D. means coupling said signaling means to said sighting means, said coupling means is connected to said signaling means by a flexible member in a manner to permit angular displacement thereof by the user to permit signaling therewith.

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4,024,829

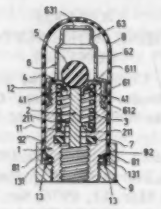
## LEAKAGE WARNING DEVICE FOR PNEUMATIC TIRE

Chiang Shui Su, No. 237, Ming-Kuo Rd., Chia-Y, China /Taiwan

Filed July 14, 1975, Ser. No. 595,884

Int. Cl.² B60C *23/02*

U.S. Cl. 116—34 R 4 Claims



1. An air leakage warning device for a pneumatic tire comprising: a housing member having a circular opening at the top end thereof; a cylinder member containing a perforated piston means and a coil spring responsive to a predetermined pressure within the tire, the upper end of the cylinder member being inter-connected with the lower section of the housing member, while the lower end thereof is provided with internal

threads and adapted to be screwed onto a conventional air filling valve stem of a tire; a rubber sack enveloping the housing member and the cylinder member and forming a receiver for escaping tire air and adapted to be ruptured by air pressure so as to emit an audible signal; a base member adapted to be affixed to the lower end of the cylinder member with the lower end of the rubber sack sandwiched therebetween thereby tightly secure the rubber sack against the cylinder member; and further comprising a rubber ball freely movable in the space defined by the housing member and the upper end of the cylinder member in order to block the circular opening of the housing member and thus prevent further escape of air immediately after the rubber sack is ruptured by the pressure of the escaping tire air.

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**4,024,830**

## ANTI-BURGLAR SOUND EMITTING DEVICE

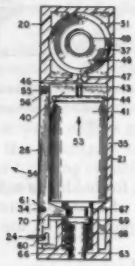
**Charles R. Fegley, 1606 Frush Valley Road, Laureldale, Pa. 19605, and Werner F. Esseluhn, 12 Larchwood Road, Wyomissing, Pa. 19610**

**Filed Dec. 15, 1975, Ser. No. 640,727**

**The portion of the term of this patent subsequent to May 11, 1993, has been disclaimed.**

**Int. Cl.² G08B *13/08***

**U.S. Cl. 116—86** **13 Claims**



1. An anti-burglar sound emitting device for use with a pressurized container, the device comprising;

a. a body member mounted on support means;

b. means for slidably supporting said pressurized container in a first chamber in said body member;

c. movable means in a second chamber in said body member for emitting sound by the use of a pressurized fluid, said movable sound emitting means comprising a closure wall for said second chamber;

d. a fluid passageway in said body member for directing a fluid from said pressurized container therethrough to said sound emitting means, said passageway having an entry section between said first and second chambers at one end of said body member;

e. a spring biasing an actuating member and arranged to move said container toward said entry section;

f. means for selectively discharging fluid from said container into said entry section;

g. means for forming a seal around said entry section of said passageway and container to allow flow to be only through said entry section whereby fluid will be discharged exclusively therethrough from said container into said passageway upon movement of said container;

h. means for releasably retaining said biased actuating member whereby said container is displaced from said entry section, said retaining means including a trigger element, said trigger element being mounted for movement between an actuation position and a release position, said trigger element in said actuation position in engagement with said biased actuating member to retain said biased actuating member in a cocked position;

i. a trigger-actuating means associated with said trigger element, said trigger-actuating means arranged to actuate said trigger element upon the application of a physical force to said trigger-actuating means, whereby said trigger element is moved to said release position, thereby causing the release of said biased actuating member from said cocked position whereby said biased actuating member causes movement of said container and thereby causes said discharge means to coact with said entry section of said passageway in allowing discharge of fluid through said passageway to said sound emitting means to produce sound.

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**4,024,831**

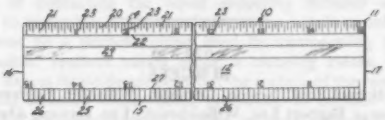
## TRANSPARENT RULER HAVING LONGITUDINALLY POSITIONED COLORED AREA FOR ISOLATING ROWS OF SYMBOLS FOR RAPID SCANNING

**Benjamin Sperling, 49 McKay Drive, Tenafly, N.J. 07670**

**Filed Oct. 10, 1975, Ser. No. 621,472**

**Int. Cl.² B42D *19/00***

**U.S. Cl. 116—119** **2 Claims**



1. As a new article of manufacture, an improved ruler of generally rectangular configuration and as transparent synthetic resinous material; said ruler having first and second edges bordering a planar surface thereof, at least one scale imprinted on said surface adjacent one of said first and second edges, said scale being bordered by a longitudinally extending line spaced inwardly from said first and second edges and parallel thereto, whereby an elongated area of relatively greater light transmissive ability is formed, a portion of said area, medially positioned relative to said first and second edges being tinted along a longitudinally extending axis, said area serving as a means for isolating rows of printed symbols for the rapid scanning thereof; said tinted portion being formed by lamination of a separate strip of tinted material.

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**4,024,832**

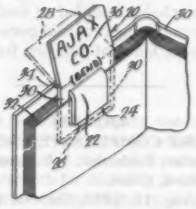
## BOOKMARKER

**Frank J. Machnikowski, 13528 S. Brandon, Chicago, Ill. 60633**

**Filed Apr. 28, 1975, Ser. No. 572,265**

**Int. Cl.² B42D *9/00***

**U.S. Cl. 116—119** **1 Claim**




1. A bookmarker adapted to be placed between one or more leaves of a book, but being freely removable therefrom, said bookmarker comprising an integral sheet of single ply paper material of a thickness substantially greater than and an initial flexibility substantially less than that of the leaves of the book, said sheet material being between 28 to 65 pound in weight and forming a first section for securing the marker to the leaves and an adjacent second section extending a substantial distance above and from the leaves, said first section

having an integral rectangular tongue cut therefrom, said tongue having a free end extending away from said second section, the remainder of said first section and said tongue being adapted to engage the leaves therebetween to hold said bookmarker temporarily in place on the leaves, indicia adjacent the juncture of said first and second sections for indicating said first section should be bent at an angle relative to said second section, said first section being bent at an obtuse angle to said second section at said juncture to form a weakened section to increase the flexibility of said bookmarker to that greater than the leaves of the book, said second section extending substantially above the leaves of the book, being out of contact with the same and having both sides thereof observable even with the book closed, said second section carrying a written message to be conveyed to the user of the book, whereby should said bookmarker be in place in the book, the message is visible, and should the book be dropped so that the extended second section of said bookmarker is struck, said bookmarker flexes at the weakend junction between the first and second sections and prevents said tongue and remaining portion of the first section from being driven inward onto the leaves to prevent damaging the book.

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**4,024,833**

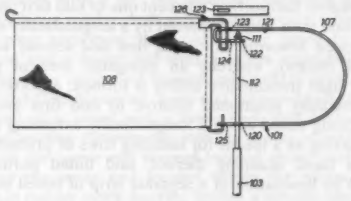
**BURGEES**

**Ian Michael Pook, Neston, Corsham, Wiltshire, England, and George Herbert Lee, Willowbrook, Lon Hawen, Abersoch, Pwllheli, Gwynedd, LL53 7EW, Wales**

**Filed Dec. 11, 1975, Ser. No. 639,732**

**Int. Cl.² G01W *1/00*; G09F *17/00***

**U.S. Cl. 116—173** **9 Claims**




1. A burgee comprising a staff, first frame means having upper and lower substantially horizontal limbs, pivot bearing means between said staff and the upper limb of said first frame means permitting said first frame means to be mounted on the staff for rotational movement about the axis of the staff, and second frame means carrying a flag and having upper and lower connector portions adjacent to the margin of the flag which is adjacent to the staff, said second frame means being adapted to be detachably coupled to said first frame means solely by the interengagement of said connector portions with said upper and lower limbs of said first frame means.

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**4,024,834**

**TEMPERATURE COMPENSATED DOCTOR BLADE**

**Robert Albert Carter, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

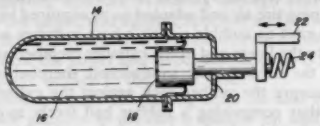
**Filed Aug. 11, 1975, Ser. No. 603,489**

**Claims priority, application United Kingdom, Sept. 24, 1974, 41414/74**

**Int. Cl.² B05C *1/00*, *11/04***

**U.S. Cl. 118—7** **6 Claims**

1. Apparatus in which a blade is urged against a surface for controlling the amount of liquid on said surface, comprising temperature compensating means adapted to increase pressure at increased operating temperatures and decrease pressure at decreased operating temperatures which comprise a fixed sealed expandable chamber containing a temperature responsive fluid and linking means responsive to said increased pressure and said decreased pressure of said expandable chamber for urging said blade into contact with said surface.

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**4,024,835**

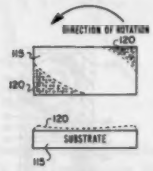
**SPINNER CHUCK FOR NON-CIRCULAR SUBSTRATES**

**Friedrich Scheu, San Jose, and Glenn W. Weberg, Saratoga, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Oct. 6, 1975, Ser. No. 619,762**

**Int. Cl.² B05C *11/12***

**U.S. Cl. 118—52** **2 Claims**




1. A spinner chuck for holding a substrate material of predetermined thickness while the substrate is spun to distribute a coating material applied to its top surface, said spinner chuck comprising:

a base portion; and

an upper portion coupled to the base portion and having a flat surface on the top thereof, said flat surface having a recessed area for receiving and holding by vacuum the substrate material, the base of the recess having a plurality of openings spaced about the periphery thereof, means for establishing a vacuum pull through said openings, the depth of the recessed area being substantially equal to the thickness of the substrate material and greater in cross-sectional area than that of the substrate whereby coating material spinning off into the volume between the substrate and the sidewall defining the recess is drained off through said openings for producing uniform distribution of the applied coating material over the top surface of the substrate.

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**4,024,836**

**TRAVERSING LEHR SPRAY**

**Charles A. Frank, Bridgeton, N.J., assignor to Owens-Illinois, Inc., Toledo, Ohio**

**Filed Mar. 22, 1976, Ser. No. 669,010**

**Int. Cl.² B05B *3/00***

**U.S. Cl. 118—323** **7 Claims**

1. In apparatus for spraying between the rows of objects arrayed in rows and columns within a lehr and that are continuously being moved by a conveyor wherein a traversing spray unit is mounted to extend into the interior of and extend transversely across the lehr, said unit including a movable carriage that is reciprocated across said lehr, the improvement comprising:

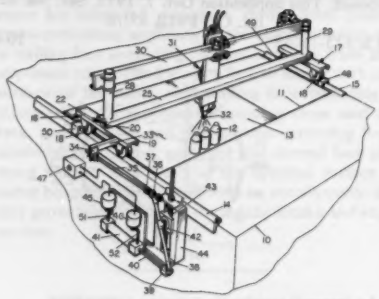
a pair of horizontal rails at either side of the top of said lehr, said rails extending parallel to the movement of the conveyor;

a first wheeled member mounted for longitudinal movement on one of said rails;

a second wheeled member mounted for longitudinal movement on the other of said rails;

a laterally extending support member pivotally connected to both said wheeled members at opposite ends thereof;

a mounting post extending upward from each of said support member, said traversing spray unit mounted to and extending between said mounting posts;



means for positioning one of said wheeled members relative to its rail; and

means for reciprocating the other of said wheeled members, said means for reciprocating the other of said wheeled members includes means for adjusting the length of the stroke of said reciprocating means whereby the spray unit is adapted to follow rows of objects moving on said conveyor regardless of the spacing of the rows of objects relative to each other by being capable of being adjusted to the spacing of the rows.

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**4,024,837**

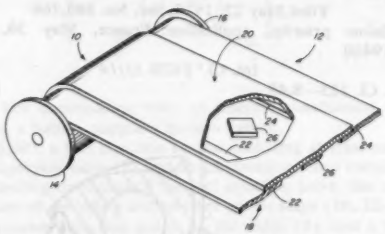
**MULTIPLE STRATUM MASK**

**George Snyder, 120 Braintree St., Allston, Mass. 02134**

**Filed Dec. 3, 1975, Ser. No. 637,294**

**Int. Cl.² B05C** *11/00, 17/06;* **B41N** *1/24*

**U.S. Cl. 118—505** **11 Claims**



1. A multi-stratum mask comprising:

a. a lower stratum having at least two endless composite strips spaced apart from one another, each said strip having superimposed layers formed by a release coating upper layer, a paint impervious intermediate layer and a pressure sensitive adhesive lower layer; and

b. a composite upper stratum superimposed on said lower stratum and covering at least a portion of each said strip, said upper stratum having superimposed layers formed by a release upper coating, a paint impervious intermediate layer and a pressure sensitive lower layer, said upper stratum lower layer releasably adheres to said release coating of said lower stratum .

**4,024,838**

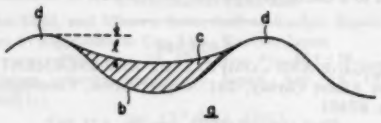
**DEVELOPER LIQUID SUPPLYING DEVICE**

**Kiyoshi Horie, Ebina, Japan, assignor to Rank Xerox Ltd., London, England**

**Filed May 7, 1976, Ser. No. 684,204**

**Int. Cl.² G03G** *15/06*

**U.S. Cl. 118—661** **13 Claims**



1. An improved liquid developer supplying device for applying liquid developer to an image bearing member comprising a developer liquid supplying member having on the surface thereof finely divided discrete depressions for containing liquid developer and at least compressible, resilient raised areas; a non-absorbent, relatively rigid, squeegee member capable of contacting the liquid supplying member and adapted to meter the liquid developer in the supply member depressions to a predetermined level by compressing the compressible, resilient raised areas; a cleaning means for cleaning excess liquid developer from the surface of the raised areas, said cleaning means being positioned to contact the raised areas subsequent to the contact between the squeegee member and the raised areas; and means for providing relative movement between the squeegee member and cleaning means and the applicator surface.

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**4,024,839**

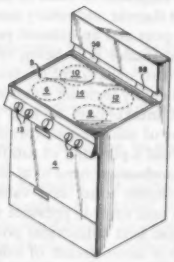
**GAS-FIRED SMOOTH TOP RANGE**

**Edward A. Reid, Jr., Westerville; George W. Myler, Upper Arlington, and James E. Payne, Columbus, all of Ohio, assignors to Columbia Gas System Service Corporation, Wilmington, Del.**

**Filed Mar. 10, 1975, Ser. No. 557,032**

**Int. Cl.² F24C** *3/04*

**U.S. Cl. 126—39 J** **21 Claims**



1. A fuel gas burner system comprising, the combination of, means for forming a passageway through which fuel gas flows from an inlet end to an outlet end, valve means at said inlet end and associated therewith for directing controlled amounts of fuel gas and air into said passageway to produce a gas mixture, ignition means adjacent said outlet end of said passageway for igniting said gas mixture flowing from said passageway, said means forming said passageway including burner tip means at said outlet end thereof through which said gas mixture is discharged, said burner tip means producing turbulence in said gas mixture and mixing and entraining ambient air with said gas mixture; means for forming a second passageway through which said gas mixture and entrained ambient air flow together to an outlet end at a heating zone in said system, a combustion chamber positioned at said heating

zone, said combustion chamber having an inlet end in alignment with the outlet end of said second passageway for receiving said gas mixture and entrained ambient air, and including means associated with said combustion chamber for permitting ambient air to flow into said combustion chamber with the gases passing from the outlet end of said second passageway, said combustion chamber extending from said inlet end thereof to a discharge zone for the products of combustion.

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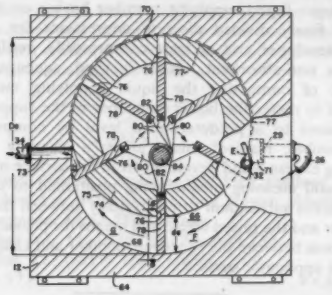
**4,024,840**

## ENGINE AND COMPRESSOR ARRANGEMENT

**Charles Albert Christy, 201 Airport Drive, Farmington, N. Mex. 87401**

**Filed Oct. 10, 1975, Ser. No. 621,567**
**Int. Cl.² F02B** *53/00*
**U.S. Cl. 123—8.41** **10 Claims**



1. A rotary engine in combination with a compressor apparatus for supplying a charge of air or an air-fuel mixture to said engine, said engine comprising an enclosed housing having a cavity extending therein, said cavity including two cylindrical portions having spaced-apart centers but having substantially equal radii of curvature, a rotor disposed in said cavity and rotatably supported in said housing for rotation about an axis coaxial with the center of a first one of said two cylindrical portions, said rotor having a plurality of radial openings therein, vane means disposed in each of said radial openings for sliding movement therein and rotary movement along with said rotor, an intake port and an exhaust port communicating with said cavity, said intake port being separated from said exhaust port by said two cylindrical portions, a second cylindrical portion of said cavity forming a circumferential channel extending from said intake port to said exhaust port, said channel in operation of said engine forming with said rotor and vane means thereof a plurality of rotating chambers moving from an intake-combustion zone to at least a power-expansion zone and an exhaust zone, said vane means extending radially outwardly of said rotor in pressure sealing relationship with said channel, said first cylindrical portion of said cavity providing an idle cycle downstream of said exhaust port and between said exhaust port and said intake port over which said rotor passes with said vane means retracted within said rotor and a circumferential groove extending in said first cylindrical portion to provide communication between radial openings simultaneously passing said first cylindrical portion to relieve pressure therein and thereby to facilitate radial movement of said vane means, said compressor apparatus comprising a casing having a hollow space extending therethrough and a rotary member disposed in said hollow space, air inlet and compressed charge outlet, means drivingly connecting said rotary member of said compressor apparatus to said rotor of said engine, conduit means connecting said compressed charge outlet of said compressor apparatus to said intake port of said engine, timed valve means disposed in said intake port cyclically opening to admit a charge into each of said rotating chambers as each of said chambers is passing through the air intake-combustion zone, ignition means disposed in said intake-combustion zone to ignite said charge upon closing of said valve means and thereby effecting a power stroke on said vane means.

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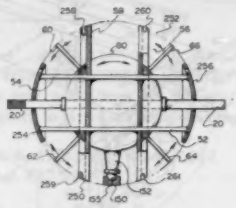
**4,024,841**

## ROTARY INTERNAL COMBUSTION ENGINE WITH OSCILLATING PISTONS

**David B. Smith, 47 Maryland Place, Calgary, Alberta, Canada**

**Continuation-in-part of Ser. No. 518,093, Oct. 25, 1974, abandoned. This application Oct. 7, 1975, Ser. No. 620,507**
**Int. Cl.² F02B** *55/16*
**U.S. Cl. 123—8.45** **10 Claims**



1. An internal-combustion engine comprising
a casing having a generally spherical inner surface and having separate inlet and exhaust openings therethrough,
a rotor shaft rotatably mounted in the casing,
a rotor mounted on the shaft and within the casing, the rotor having a plurality of outlying points thereon, the loci of the outlying points defining during rotor rotation a generally spherical surface which is essentially in contact with the inner surface of the casing, and the rotor containing at least one combustion chamber in the form of a hollow segment of a sphere,
angularly disposed piston means within the combustion chamber, and
porting means carried by, affixed to, and rotating directly with the rotor and directly alignable with the inlet and exhaust openings in the casing for selective admission and emission of gaseous media to and from the combustion chamber.

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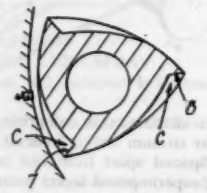
**4,024,842**

## ROTARY ENGINES

**Fernand Dumaine, 1 Boulevard National, 13001 Marseille, France**

**Filed May 27, 1975, Ser. No. 580,760**
**Claims priority, application France, May 30, 1974, 74.19460**
**Int. Cl.² F02B** *55/14*
**U.S. Cl. 123—8.45** **1 Claim**



1. A rotary internal combustion engine comprising a stator housing, a driving shaft journalled for rotation in said stator housing, an eccentric mounted on said driving shaft and positioned in said stator housing, and a rotor carried by said eccentric for rotation in said housing, said rotor considered in a plane normal to the axis of rotation of the driving shaft having a cross-section which is approximately an equilateral triangle

with curvilinear side, each side of said rotor having its external peripheral surface defining with the internal periphery of the stator housing a respective combustion chamber, each side surface of the rotor having a recess which extends radially from said surface, said recess being approximately the shape of an isosceles triangle and having its base at the leading end and its apex at the trailing end when considered in the direction of rotation of the rotor, said recess being bounded by:

i. a leading end face, at the base end of the recess, which is substantially normal to the peripheral side surface of the rotor for receiving maximum thrust from combustion gases circulating angularly in the stator housing, and

ii. a trailing face extending circumferentially from the radially-inner edge of said leading face to merge with said side surface of the rotor, said trailing face including a first intermediate face portion extending from said leading face, and a second end face portion extending from said intermediate portion, said first and second face portions being shaped in relation to the internal surface of the stator housing so as to constitute an aerodynamic accelerator providing turbulence during the intake and explosion strokes.

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**4,024,843**

## FUEL INJECTION SYSTEM FOR COMBINATION WITH INTERNAL COMBUSTION ENGINES, HAVING A UNIVERSALLY CONNECTABLE INPUT TRIGGER STAGE

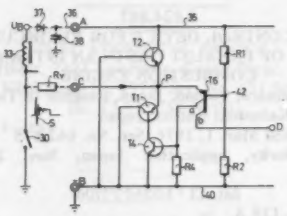
**Karl-Heinz Adler, Leonberg; Ulrich Drews, Vaihingen, Enz-Pulverdingen; Erwin Gloss, Korntal, and Adolf Kugelmann, Leonberg, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany**

**Filed Dec. 2, 1975, Ser. No. 637,062**

**Claims priority, application Germany, Jan. 25, 1975, 2503108**

**Int. Cl.² F02B** *3/00*

**U.S. Cl. 123—32 ED** **14 Claims**



1. For combination with an internal combustion engine having a battery supplied ignition system,

(20,30), a fuel injection system including at least one fuel injection valve (2) and an electronic control circuit controlling operation of the fuel injection valve, the control circuit including a controlled power stage (10, 22-25) to provide injection pulses to the valve (2), and a trigger stage (21) connected to the ignition system of the engine to provide trigger pulses to the power stage, energized by the battery (B), wherein the trigger stage (21) comprises:

a voltage divider (R1, R2; R3);

a double-collector transistor (T6) having its base connected to the tap point (42) of the voltage divider, and a protective circuit (T1, T4, T5; T2, T7) protecting the input (C) of the trigger stage from overloading, and the remaining circuit components against undesired stray pulses when the trigger stage has input signals (S) applied thereto of excess energy level,

said double-collector transistor (T6) being connected to the output (D) of the trigger stage (21) and hence to the power stage (10; 22-25) of the system, and being further connected to and controlling the protective circuit.

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**4,024,844**

## IGNITION DEVICE FOR AN INTERNAL COMBUSTION ENGINE WITH CAM DESIGN FOR PREVENTING UNDESIRED FIRINGS

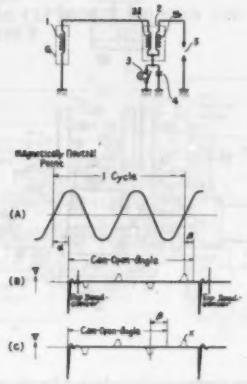
**Hideo Fujii, and Minoru Kato, both of Kariya, Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Apr. 23, 1974, Ser. No. 463,429**

**Claims priority, application Japan, Apr. 28, 1973, 48-51468[U]**

**Int. Cl.² F01L** *13/02*

**U.S. Cl. 123—41 R** **6 Claims**




1. An ignition device for an internal combustion engine comprising:

spark plug;

a magneto generator having a generating coil and being rotated in synchronism with the engine;

an ignition coil having a primary winding connected in series with said generating coil and a secondary winding connected to said spark plug;

a breaker contact connected in series with said primary winding, and

cam means synchronized with said engine for opening and closing said contact to prevent undesired firing of said spark plug during forward or reverse engine rotation by being so constructed in profile that the duration Z in which said breaker contact is open is only between 270° and 360° as determined by the following equation:

$$Z = \left(\frac{360°}{P} - \alpha\right) + \frac{360°}{P} \times (P - 1) + \beta$$

wherein,

P is the number of magnetic poles of the magneto generator,

$\alpha$ is an angle greater than 0° but less than 360°P measured in a forward direction relative to said forward engine rotation from the first magnetically neutral point in a cycle of said generator to an opening point of said breaker contact,

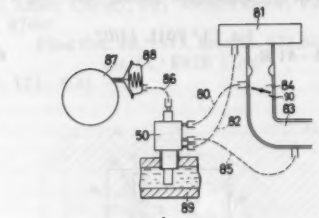
$\beta$ is an angle greater than 0° but less than $\alpha$ measured in said forward direction from the last magnetically neutral point in said cycle to a closing point of said breaker contact.

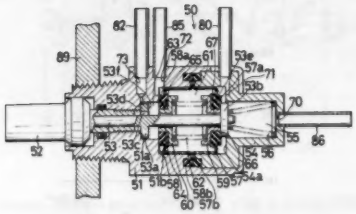
## 4,024,845

## TEMPERATURE RESPONSIVE PNEUMATIC IGNITION TIMING CONTROL DEVICE

Isshi Nomura, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Japan

Division of Ser. No. 507, 801, Sept. 20, 1974, Pat. No. 3,987,770. This application Feb. 26, 1976, Ser. No. 661,554
Int. Cl.[2] F02B 9/02
U.S. Cl. 123—117 A 6 Claims





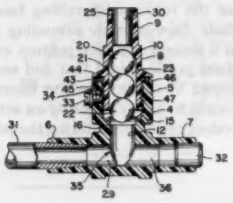
1. An ignition timing control device for an internal combustion engine comprising:
- a body having means defining an axial bore therein;
- first, second, third, and fourth ports communicating with said bore;
- a first passageway for establishing communication between said first and second ports;
- a second passageway for establishing communication between said first and fourth ports;
- a third passageway for communicating said third port with said second passageway;
- first valve means provided within said first passageway and adapted to open at low engine temperatures, that is, below the normal operating temperature of the engine, and which is also adapted to close at intermediate engine temperatures, that is, the normal operating temperatures of the engine, as well as at high engine temperatures, that is, above the normal operating temperatures of the engine;
- second valve means provided within said second passageway and adapted to close at said low engine temperatures and which is also adapted to open at said intermediate and high engine temperatures;
- third valve means provided within said third passageway and adapted to close at said low and intermediate engine temperatures and which is adapted to open at said high engine temperatures;
- first operating means for operating said first valve means;
- second operating means for operating said second valve means;
- third operating means for operating said third valve means;
- a temperature sensitive control device responsive to the operating temperature of said engine and having an extensible plunger axially movable within said bore from an initial position corresponding to said low engine temperature to at least one actuated position corresponding to said high engine temperature for operating said first, second, and third operating means; and
- biasing means for normally biasing said plunger to said initial position.

## 4,024,846

## VALVE DEVICE AND SYSTEM EMPLOYING THE SAME

Andrew E. MacGuire, Willowdale, Canada, assignor to The Ferry Cap & Set Screw Company, Cleveland, Ohio

Filed Nov. 1, 1974, Ser. No. 519,863
Int. Cl.[2] F02M 25/06, 23/08
U.S. Cl. 123—119 D 20 Claims



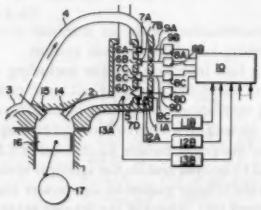
1. In combination with an internal combustion engine having an intake manifold and carburetor, pressure responsive valve means for supplying auxiliary air to said manifold, said valve means comprising a valve chamber having an inlet and an outlet, a plurality of resiliently deformable spherical members within said chamber intermediate said inlet and outlet, said spherical members being positioned within said valve member to resonate over substantially the full operating range of said engine to cause the auxiliary air passing therethrough to pulsate creating turbulence in the air flow entering said manifold resulting in shock waves which assist in breaking up the fuel into smaller, more uniform particle sizes and maintaining a more constant air/fuel mixture over such operating range.

## 4,024,847

## DIGITAL CONTROL DEVICE FOR RECIRCULATED FLOW OF EXHAUST GAS IN AN INTERNAL COMBUSTION ENGINE

Shunji Koganemaru, Susono, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Mar. 1, 1976, Ser. No. 662,875
Claims priority, application Japan, Nov. 25, 1975, 50-140897
Int. Cl.[2] F02M 25/06
U.S. Cl. 123—119 A 9 Claims



1. A digital control device for controlling the flow rate of recirculated exhaust gas within an internal combustion engine comprising:
- a cylinder;
- a suction tube and an exhaust tube connected to said cylinder;
- a recirculation pipe interposed between said suction tube and said exhaust tube;
- a plurality of valve openings provided within a partition wall which separates said recirculation pipe and said suction

tube which partially adjoin each other over a specified extent thereof; p1 valve means for opening and closing said valve openings; and

a digital computer, for opening and closing specific valves in response to various signals generated from said internal combustion engine, connected to said valves.

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**4,024,848**

## ARRANGEMENT FOR PREVENTING WATER FROM ENTERING A FUEL SYSTEM OF AN INTERNAL COMBUSTION ENGINE

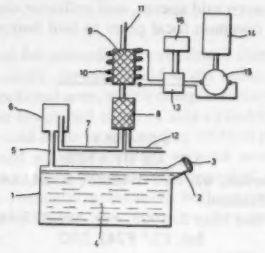
**Wenpo Lee, Wolfsburg, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Germany**

**Filed Apr. 28, 1975, Ser. No. 572,329**

**Claims priority, application Germany, May 7, 1974, 2421938**

**Int. Cl.² B01D** *53/26*

**U.S. Cl. 123—136** **9 Claims**



1. In an internal combustion engine operated with a gasoline-methanol mixture as fuel and including a fuel system for supplying the fuel to the internal combusion engine: the improvement comprising a water-absorbing filter and a ventilating line connected to the fuel system and passing through the filter, whereby moisture in the ventilating line is removed so that the fuel system is ventilated with dry air.

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**4,024,849**

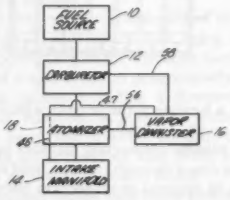
## FUEL ATOMIZING DEVICE

**Robert G. Hoots, 7421 Lawrence, Grand Blanc, Mich. 48439**

**Filed Mar. 18, 1974, Ser. No. 451,949**

**Int. Cl.² F02M** *29/00*

**U.S. Cl. 123—141** **10 Claims**




1. A liquid fuel atomizer in combination with an internal combustion engine of the type having an intake manifold, a carburetor and a fuel circulation system, comprising:

a. a base member interposed between the intake manifold and the carburetor of the engine and having at least one throughbore formed therein and at least one transverse bore formed therein;

b. a plurality of superposed fine mesh grids disposed in the througbore and defining a grid region;

c. means for drawing off excess atomized fuel connected to the transverse bore;

d. means for generating a vacuum across the throughbore and communicating between the intake manifold and the fuel circulation system whereby a suction is created into the intake manifold to cause a fast flow of mist to issue from the bottom of the grid region into the intake manifold, and

wherein the transverse bore is associated with the throughbore and is in communication therewith in the grid region, and excess atomized fuel is drawn off through the transversed bore and the means for drawing off is connected thereto.

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**4,024,850**

## INTERNAL COMBUSTION ENGINE MONITOR SYSTEM

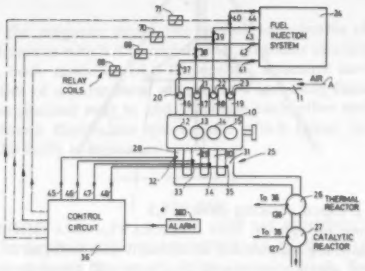
**Bernd Peter, Kornwestheim, and Peter Jürgen Schmidt, Schwieberdingen, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany**

**Filed Apr. 29, 1974, Ser. No. 465,351**

**Claims priority, application Germany, June 14, 1973, 2330258**

**Int. Cl.² F02B** *77/00*; **F01N** *3/00*

**U.S. Cl. 123—198 F** **7 Claims**




1. A reactor protective system to protect a catalytic reactor connected to a multicylinder internal combustion engine system against damage or destruction due to excessive temperatures arising in the reactor, said reactor protective system comprising

engine operation sensing means (**32–35**) located in sensing relation to each of the cylinders (**12–15**) of the engine (**10**), sensing a characteristic of a combustion event in the respective cylinder to monitor combustion of fuel and air supplied thereto, and providing a respective combustion monitor signal representative of conditions, indicative of presence, or absence of combustion in a respective cylinder;

supply control means (**37–40; 68–71**) controlling supply of combustible mixture of air and fuel to respective cylinders; and

separate threshold switches (**56, 61, 65**) associated with and connected to each sensing means (**32–35**) associated with respective cylinders of the engine, the threshold switches providing a threshold level forming a reference or command level for the combustion monitor signal of each of the cylinders and changing state if the monitor signal from the sensing means passes the threshold level of the threshold switch means, said threshold level being matched to the operating temperature of the catalytic reactor under normal conditions, said threshold switches being further connected to said supply control means to inhibit supply of combustible mixture to the respective cylinder from which a monitor signal is derived which causes the threshold switch to change state to thereby inhibit escape of unburnt fuel-air mixture from the engine into the reactor and combustion of said unburned mixture therein and thus prevent consequent damage to the reactor;

and a condition signal generating circuit (**148, 149, 150, J, L; 112, 113, 114, J', L'; 51, 54**) generating a signal repre-

sentative of, and controlling the threshold level at which the separate threshold switches (56, 61, 65) change state; wherein the condition signal generating circuit comprises a coupling circuit (148, 149, 150; 112, 113, 114) having an output junction (J, J');

a transistor (51) in emitter-follower circuit connected to said output junction (J, J') and a Zener diode (54) coupling the transistor (51) and said separate threshold switches to apply the signal controlling the threshold level of said switches to said switches.

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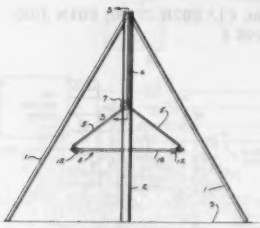
## 4,024,851
## TRIPOD COOKING DEVICE

Robert A. Boda, 4405 James Road, Rte. 3, Oshkosh, Wis. 54901

Filed May 19, 1975, Ser. No. 578,641
Int. Cl.² A47J 37/00; F24B 3/00; F24C 1/16
U.S. Cl. 126—30 8 Claims



3. In a tripod cooking device:

a. a pair of legs,

b. a third leg adapted for attachment with said pair of legs to form a pyramidal tripod and with said attachment being at the apex of said pyramid,

c. a cooking grill assembly,

d. and suspension means for said grill assembly and with said suspension means passing over said apex,

e. the upper apex end of said third leg being formed to provide a guide for said suspension means,

f. the side wall of said third leg adjacent said apex having openings therein for passage of the upper ends of said pair of legs therethrough into the interior of said third leg,

g. said formed guide portion of said third leg comprising stop means for the said upper ends of said pair of legs.

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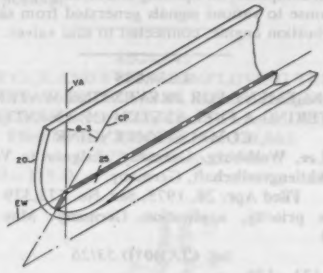
## 4,024,852
## SOLAR ENERGY REFLECTOR-COLLECTOR

Paul M. L'Esperance, Box 482, Oakwood Lane, Valley Forge, Pa. 19481, and Alex Pavlak, Jug Hollow Road, Phoenixville, Pa. 19460

Filed Feb. 5, 1976, Ser. No. 655,431
Int. Cl.² F24J 3/02
U.S. Cl. 126—270 12 Claims

1. A radiant solar energy collector system comprising an elongated collector-reflector having a longitudinal center plane parallel to the east-west axis, said collector-reflector including a longitudinal collector element and a semi-tubular reflector having two sidewalls and a bottom wall enclosing said collector element and having reflective surfaces to accept radiation energy entering the reflector between said sidewalls and reflect it so as to impinge against said collector element, said transfer means to receive the energy from said collector element and condition the same for use, said two sidewall reflective surfaces comprising walls extending parallel to the east-west axis with semi-parabolic interior surfaces having a common focal point coincident with said center plane, each semi-parabolic surface having its axis extending from said focal point outwardly away from said center plane at a fixed angle and its apex adjacent said bottom wall whereby said semi-parabolic surface does not intersect the center plane, the fixed angles of said two sidewall axes of opposite sides of the center plane defining between them an included angle for



reception of radiant energy, said bottom wall being dished and extending between said apexes, said collector element extending from said common focal point to said bottom wall.

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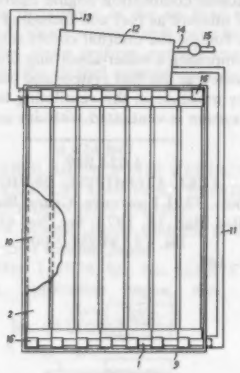
## 4,024,853
## SOLAR HEATER

Robert M. Gordon, 62, New Windsor Road, Avondale, Auckland, New Zealand

Filed May 2, 1975, Ser. No. 573,949
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 7 Claims



1. For use in a heating arrangement which in use has fluid flowing therethrough, in combination:

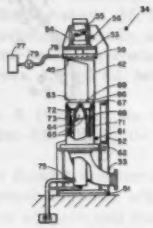
i. at least one tubular connecting member open at each of its ends and having a through passage, said connecting member having its internal cross-section circular at one of its ends, said connecting member having its external cross-section circular at the other of its ends, said external cross-section being of less diameter than said internal cross-section whereby a plurality of said tubular connecting members may be assembled serially by engagement of an end of each into an end of the next, each connecting member having a portion projecting radially therefrom along part of its length, said projecting portion defining a rectangular passage opening at one end to the exterior of the connecting member and opening at the other end into the through passage of the connecting member, and

ii. at least one substantially hollow elongate member having at least one end thereof a rectangular cross-section of such dimensions as to fit within the rectangular passage of said projecting portion.

## 4,024,854
## DRUM UNLOADING APPARATUS AND METHOD

George C. Park, Bristol, N.H., and Arthur B. Porter, Andover, Mass., assignors to Bolton-Emerson, Inc., Lawrence, Mass.

Filed Dec. 31, 1975, Ser. No. 645,893
Int. Cl.² B30B 15/34
U.S. Cl. 126—343.5 A 14 Claims



11. A method for unloading a cylindrical shipping drum of solid high viscosity material, said drum being of predetermined cross-sectional area, which comprises the steps of:

removing the lower end cover of said cylindrical drum and mounting said drum in upstanding vertical position, with the exposed solid lower face of said material at said open lower end horizontal and supported on the upper face of a vertically upstanding hollow cylindrical heat exchanger of slightly less diameter than the diameter of said drum;

heating the upper face and elongated outer cylindrical face of said exchanger to a temperature above the melting point of said material,

and applying downward pressure in a vertical direction to the upper end of said drum to guide, support and sleeve said drum on said vertically upstanding heat exchanger while forcing the melted liquid material of said drum down through said heat exchanger as it melts from bottom to top.

13. Apparatus for progressively melting and dispensing a mass of solidified meltable material contained in a cylindrical shipping drum, said apparatus comprising;

an upstanding, fixed piston head of cylindrical configuration, having an elongated cylindrical outside wall of uniform diameter dimensioned to slideably fit within, support and guide the inside cylindrical wall of said drum for the full depth thereof;

heating means disposed longitudinally of the upper face of said piston head, said upper face being dimensioned to abut the exposed face of the meltable material in an open lower end of a said drum to progressively melt the same.

powered press means including a downwardly moveable upper platen, mounted at a spaced distance above said fixed piston head, and in direct pressure contact with the upper rim of an upstanding said drum for sleeving said drum down around said piston head,

and channel means within said fixed piston head, for collecting liquid material, progressively melted by said upper face thereof, and delivering the same to a predetermined location.

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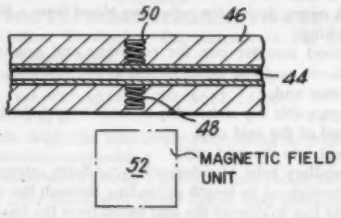
## 4,024,855
## MAGNETIC FILAMENTARY STRUCTURE AND METHOD FOR USING THE SAME

Louis Bucalo, 155 Roberts St., Holbrook, N.Y. 11741

Division of Ser. No. 537,572, Dec. 30, 1974, Pat. No. 3,982,537. This application Nov. 18, 1975, Ser. No. 633,015
Int. Cl.² A61B 19/00
U.S. Cl. 128—1 R 9 Claims

1. In a method to be performed on subjects such as human beings, animals, and the like, the step of implanting in internal tissue of the subject a means for dynamically acting through the tissue in which it is implanted for changing the condition of the subject, said means which is implanted in said tissue including a filamentary permanent magnet structure shaped to have a configuration providing between adjoining portions of the filamentary structure spaces which will enable ingrowth of tissue to take place into said spaces of the filamentary magnet




so that the magnetic properties thereof are capable of giving to the tissue in which it is implanted a muscular characteristic.

6. A body made up of a filamentary structure having the properties of a permanent magnet and including filamentary portions situated next to and adjoining each other and defining between themselves spaces into which tissue can grow when the body is implanted.

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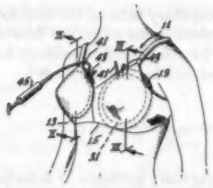
## 4,024,856
## METHOD AND APPARATUS FOR MEASURING THE VOLUME OF ASYMMETRICAL BREASTS

Timofey Gregory Kirianoff, 2080 Century Park East, Los Angeles, Calif. 90067

Filed Oct. 30, 1975, Ser. No. 627,126
Int. Cl.² A61B 5/10
U.S. Cl. 128—2 S 9 Claims



1. Apparatus for measuring the volume of a breast comprising

a cup-like template suitably sized to contain and encompass a breast to be measured and having

an interior wall locatable in proximity to a breast to be measured,

sealing means about the periphery thereof for contact with a patient's skin in the area about the breast to be measured,

a first connector means in said template for passage of a liquid into the volume formed between said interior wall and the breast to be measured when the template is sealed against the patient's skin by said sealing means, and

a second connector means in said template for passage of fluid out of the volume between said interior wall and the patient's breast as liquid is injected into the volume,

means for moving a liquid through said first connector, and

means for measuring the volume of a liquid moved into the volume between said interior wall and a patient's breast through said first connector.

## 4,024,857
## MICRO BLOOD COLLECTION DEVICE

Jacob B. Blecher, Fairlawn; Gene W. Tabor, Kinnelon; Charles F. Steinbrink, Jr., Denville, and Bruce H. Wand, Morristown, all of N.J., assignors to Becton, Dickinson and Company, East Rutherford, N.J.

Continuation-in-part of Ser. No. 535,415, Dec. 23, 1974, abandoned. This application Dec. 11, 1975, Ser. No. 639,858
Int. Cl.² A61B 5/14
U.S. Cl. 128—2 F 12 Claims

1. A micro device for collecting blood from a blood source comprising:

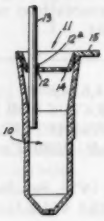
a blood sampler cup for receiving and holding the said blood, said cup being closed at one end and open at the other end;

a removable top removably secured to and closing the open end of the said cup;

a vent into the said cup;

a capillary tube of substantially uniform internal diameter throughout its length projecting through the said top into the cup to convey the said blood from the blood source to the said cup, the said capillary tube being so positioned that the end of tube within the cup will be proximate to the interior surface of the side wall of the cup;

whereby the blood can flow directly from the blood source



through the capillary tube to the interior side wall of the cup along a contiguous path, the flow of the blood into the tube is initiated under positive capillary pressure essentially defined by the equation

$$P_c = \frac{4\sigma}{D}\cos\theta \qquad (A)$$

where $P_c$ equals capillary pressure, $\sigma$ is surface tension of the fluid, D is capillary tube diameter and $\theta$ is the contact angle between the fluid and the tube material, flow of blood through the tube is continued under the influence of the force of gravity such that a droplet of blood forms at the distal end of the tube experiencing the pressure $4\sigma/D$ and satisfys the relationship

$$L \cdot D \geq \frac{4\sigma}{\rho g \cos\phi} \qquad (B)$$

where L is the length of the capillary tube, $\rho$ is the fluid density, $g$ is the acceleration due to gravity, and $\phi$ is an arbitrary angle which the capillary tube makes with the vertical, the droplet forming at the distal end adapted to engage with the interior surfaces of the cup and flow will continue in a constant manner according to the formula

$$\dot{M} = \frac{\rho^2 \pi D^4 g}{128 M \mu}\cos\phi \qquad (C)$$

where M is the mass flow rate and $\mu$ is the viscosity of the fluid.

## 4,024,858
## ENDOSCOPE

Toshio Chikama, Tokyo, Japan, assignor to Machida Endoscope Co., Ltd., Tokyo, Japan

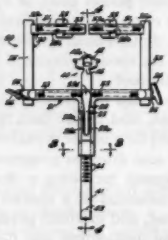
Filed Jan. 30, 1975, Ser. No. 545,587
Int. Cl.² A61B 1/26
U.S. Cl. 128—4 8 Claims

1. An endoscope for insertion into the body through the mouth and into the gullet comprising a grip portion end located outside the body, an intermediate portion for location in the gullet, and a tip end, said intermediate portion being flexible and comprising two tubes arranged side by side, said two tubes being joined at said tip and grip portion ends, said intermediate portion including said two tubes comprising a fixed cross-sectional non-circular shape having opposite sides thereof in parallel relation to conform to the shape of the gullet, said intermediate portion retaining said non-circular shape and bearing against the gullet to prevent rotation of the intermediate portion held in the gullet while transmitting angular rotation of the grip portion end to the tip end so that said tip and grip portion ends rotate an equal amount.

## 4,024,859
## MOUTH GAG HAVING THREE DIMENSIONAL ALVEOLUS RETRACTOR ADJUSTABILITY

David H. Slepyan, Virginia Beach, Va., and Jack Nestor, Miami Beach, Fla., assignors to Nestor Engineering Associates, Inc., Miami, Fla.

Filed Sept. 8, 1975, Ser. No. 611,440
Int. Cl.² A61B 1/00
U.S. Cl. 128—12 7 Claims



1. In a jaw retractor instrument, a transverse arcuate support bar sized and shaped to conform to the face below the lips, a slideway medially located on said bar extending at right angles thereto, a tongue retractor having an elongated handle terminating at an upper end in a right angularly disposed tongue blade, said handle being removably and slidably mounted in said slideway for adjustment of said blade with respect to said support bar, and a clamp terminating each opposite end of said support bar, each of said clamps being formed to removable support in right angular relation to said support bar a cylindrical post of an alveolus retractor which has upper jaw engaging means for coacting with said tongue retractor to retain the mouth in a desired open position, each of said clamps having manual tightening means providing both axial and rotational adjustability of its said post therein, each independent of the other.

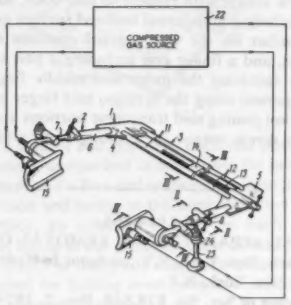
4,024,860

## APPARATUS FOR DRAWING TOGETHER AND FIXING THE PELVIC HALVES IN PUBIC SYMPHYSIS RUPTURES

Gennady Ivanovich Cheinokov, ulitsa Scherbakova, 13, kv. 51, Mytischi Moskovskoi oblasti; Leonid Gershevich Ruvinsky, ulitsa Akademika Komarova, 6, kv. 30, Moscow; Igor Leonidovich Kovalenko, ulitsa Chapaeva, 7, kv. 30, Khimki Moskovskoi oblasti; Ivan Ivanovich Sokolov, ulitsa V. Ulbrikhta, 19/10, kv. 55, Moscow; Nikolai Semenovich Belyaev, ulitsa B. Rupasovskaya, 35, Mytischi Moskovskoi oblasti; Vladimir Pavlovich Okhotsky, ulitsa V. Ulbrikhta, 4, korpus 2, kv. 69, and Leonid Lavrentievich Belyshev, ulitsa Akademika Komarova, 13, kv. 52, both of Moscow, all of U.S.S.R.

Filed Jan. 5, 1976, Ser. No. 646,489
Int. Cl.² A61F 5/04
U.S. Cl. 128—84 R 7 Claims

1. An apparatus for drawing together and fixing the pelvic halves in pubic symphysis ruptures, which comprises: a U-shaped frame; supports whereon said frame is mounted; two elastic members designed to cooperate with the patient's body which are disposed on the ends of said frame and are adapted to move toward each other as well as turn about an axis paral-



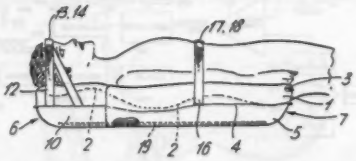

lel to the direction of said counter motion; servos coupled to said elastic members which provide for said counter motion of said elastic members and cause the latter to exert a desired compressive effort on the patient's body for a specified length of time; and a power source coupled to said servos.

4,024,861

## SPINAL SUPPORT

David Conway Vincent, 33 Driftwood Drive, Brantford, Ontario, Canada (N3R 3K2)

Filed Apr. 30, 1976, Ser. No. 681,774
Claims priority, application Canada, May 13, 1975, 226766
Int. Cl.² A61F 5/04
U.S. Cl. 128—87 R 16 Claims




1. Spinal support comprising, in combination:
a. a back support of the type of an inflatable bag comprising an inner, body supporting shell portion and an outer shell portion, said shell portions being generally identical in size and shape and having each a head portion and a body portion defining a head portion a head portion and a body portion of said bag;
b. first securing means arranged for securing said head portion of the bag to the head of a victim;
c. second securing means arranged for securing said body portion of the bag to the body of said victim;
d. longitudinal reinforcement means secured to said outer shell, said reinforcement means being adapted to provide at least a portion of said outer shell with rigidity in longitudinal direction thereof.

4,024,862

## DRAPE FOR EXPANDED SURGICAL PROCEDURE

Robert F. Collins, Barrington, Ill., assignor to The Kendall Company, Boston, Mass.

Filed May 12, 1976, Ser. No. 685,573
Int. Cl.² A61F 13/00; A61L 15/00
U.S. Cl. 128—132 D 14 Claims

1. A sterile drape for selectively performing an expanded surgical procedure, comprising:
a flexible main sheet having a lower surface facing toward a patient after placement of the drape, and an upper surface facing away from the patient after placement of the drape, said drape having a fenestration of a sufficient size for performing an enlarged surgical procedure; and
a flexible frame sheet having a size greater than said drape fenestration and removably secured to the upper surface

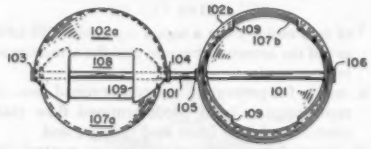
of the drape around said fenestration, said frame sheet having a fenestration of a size smaller than and aligned with the drape fenestration for performing a reduced surgical procedure, said frame sheet being removed from the drape for performing the enlarged surgical procedure though the drape fenestration.

4,024,863

## HAND RESTRAINING DEVICE

Dennis C. Ball, 1403 Beechview Ave., Pittsburgh, Pa. 15216

Filed Apr. 27, 1976, Ser. No. 680,786
Int. Cl.² A61F 13/00
U.S. Cl. 128—133 20 Claims




1. An apparatus for restricting hand movement comprising: two closures, each of said closures comprised of:
a. a first hollow spherical sector;
b. a second hollow spherical sector mounted within said first hollow spherical sector to provide for relative rotatable movement of said first and second sectors to provide a closure, said second hollow spherical sector being of sufficient volume to receive the closed fist of a human hand;
c. an aperture provided at the intersection of the edges of each of said first and second sectors to allow a wrist to traverse the closure while maintaining the fist within the closure;
d. means for securing said closure by fixing the relative positions of said first and second sectors; and,
means for permanently attaching said closures to each other.

## 4,024,864
## INJECTOR WITH OVERSPEED PROTECTOR

**Gomer L. Davies, Fort Lauderdale, and Ira R. Baker, Miami, both of Fla., assignors to Cordis Corporation, Miami, Fla.**

**Filed Sept. 5, 1975, Ser. No. 610,566**
**Int. Cl.² A61M 5/00**
**U.S. Cl. 128—214 F** **3 Claims**

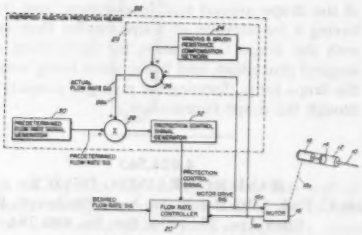
1. A flow rate controlled angiographic injector with an overspeed injection protection means comprising, in combination:

A. an injector means including a syringe having a plunger and having a reservoir connected thereto for storing a contrast medium for injection into a blood vessel, and including a d.c. motor and plunger coupling means for driving said plunger to inject said contrast medium into a blood vessel, said motor being responsive to a motor drive signal,

B. a flow rate control means responsive to a binary control signal to generate said motor drive signal, said drive signal being related to the difference between the actual flow rate of said contrast medium from said syringe and a desired flow rate when said control signal is representative of a first binary state, and being equal to a disabling signal for said motor when said control signal is representative of a second binary state, and

C. an overspeed injection protection means including:

i. means for generating an actual flow rate signal representative of the actual flow rate of said contrast medium from said syringe, said actual flow rate signal generating means including means for subtracting a signal representative of the voltage across the armature



of said motor from a signal representative of the product of the armature current and the armature and brush resistances,

ii. means for generating a predetermined flow rate signal representative of a predetermined flow rate of said contrast medium from said syringe, and

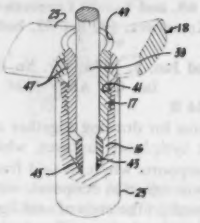
iii. means for generating said binary control signal, said control signal being representative of said first binary state when said actual flow rate is less than or equal to said predetermined flow rate, and said second binary state otherwise.

## 4,024,865
## SYRINGE

**Donald E. Howlett, Reno, Nev., assignor to Hamilton Company, Reno, Nev.**

**Filed Sept. 16, 1975, Ser. No. 613,821**
**Int. Cl.² A61M 5/00**
**U.S. Cl. 128—218 PA** **5 Claims**

1. A syringe comprising a hollow body having a barrel and an internally threaded holder, a plunger in said hollow body, a needle extending axially from said barrel of said hollow body, means for manually depressing said plunger to expel the contents of said barrel of said hollow body through said needle, friction means mounted in said holder of said hollow body, said friction means comprising an annular member of deformable material surrounding said plunger for frictionally engaging said plunger with a force related to the axial pressure exerted on said friction means, friction screw means threadably engaged with said holder of said body and rotatable with respect thereto for movement axially thereof, said friction screw means engaging said friction means for exerting axial pressure thereon dependent upon the axial position of said



friction screw means with respect to said body, said holder of said body including an internal inclined surface engaging said annular member on the side thereof opposite said friction screw means, and a finger grip including a pair of transverse portions for receiving the index and middle fingers, respectively, of a person using the syringe, said finger grip having a central portion joining said transverse portions and secured to said friction screw means for rotating same with respect to said body.

## 4,024,866
## SURGICAL APPARATUS FOR REMOVAL OF TISSUE

**Mark Wallach, New York, N.Y., assignor to Hydro Pulse Corporation, New York, N.Y.**

**Continuation of Ser. No. 528,810, Dec. 2, 1974, Pat. No. 3,930,505, which is a continuation-in-part of Ser. No. 481,952, June 24, 1974, abandoned, which is a continuation-in-part of Ser. No. 285,002, Aug. 30, 1972, Pat. No. 3,818,913. This application Oct. 10, 1975, Ser. No. 621,457**
**Int. Cl.² A61M 1/00; A61B 17/32**
**U.S. Cl. 128—276** **13 Claims**

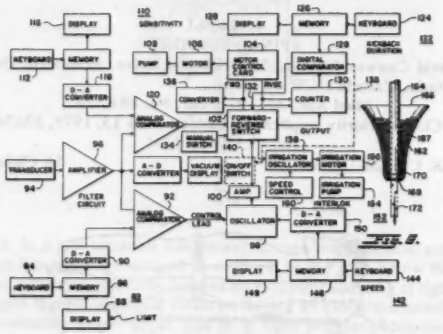


FIG. 5.

1. An apparatus for removal of unwanted tissue, liquids and contained matter by suction from a preselected area of a living body comprising a hand manipulatable suction tube having a distally disposed outlet port, a source of suction, means including a flexible conduit connecting said tube to said source of suction, and control means sensing a predetermined change in vacuum pressure in the suction conduit for terminating said suction and supplying liquid at above atmospheric pressure to the suction conduit.

4,024,867

## DISPOSABLE DIAPER WITH PERMANENTLY ATTACHED ADHESIVE BELT FASTENING MEANS

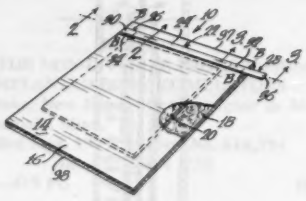
Frederick K. Mesek, Downers Grove, Ill., assignor to Johnson & Johnson, New Brunswick, N.J.

Continuation of Ser. No. 561,018, March 21, 1975, abandoned. This application Feb. 18, 1976, Ser. No. 658,986

Int. Cl.[2] A61F 13/16

U.S. Cl. 128—287 9 Claims

1. A disposable diaper having an absorbent layer defining a diaper inside surface which is directed toward an infant when worn by that infant, a moisuture-impervious backing sheet overlying said absorbent layer and defining a diaper outside surface, and an adhesive tab fastener means which comprises an elongated flexible strip extending transversely across said diaper along a marginal portion of said backing sheet, having a mid-portion thereof permanently attached to said backing



sheet and a pair of end portions, each end portion having an inward section, unattached to and within the perimeter of said backing sheet and a free end section; a release coating on said inward section and facing in the same direction as said diaper inside surface; an adhesive coating on each said free end section and facing in the same direction as said release coating when the diaper is ready for use; each said free end section being adapted for folding over upon said inward section and releasably adhering thereto.

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4,024,868

## PERMANENT ANEURYSM CLAMP

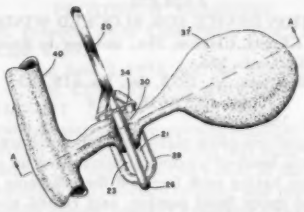
Robert W. Williams, 3201 S. Maryland Parkway, Las Vegas, Nev. 89109

Continuation-in-part of Ser. No. 546,209, Feb. 3, 1975, Pat. No. 3,996,937. This application Oct. 6, 1975, Ser. No. 619,703

Int. Cl.[2] A61B 17/12

U.S. Cl. 128—325 13 Claims

1. A clamp for occluding a vascular aneurysm comprising first and second elongated outside rods and a third elongated rod therebetween said rods being interconnected, spaced apart and parallel and having their respective elongated axes lying along a single plane when said clamp is closed, a means



for moving at least one of said rods out of said plane for opening and closing said clamp, a bridge member secured to and extending between ends of said first and second rods, and a finger portion secured at an end of said third rod and extend- over said bridge member and beyond said plane.

4,024,869

## RESECTOSCOPES

Ludwig Bonnet, Knittligen, Germany, assignor to Richard Wolf GmbH, Knittlingen, Germany

Filed Dec. 8, 1975, Ser. No. 638,424

Claims priority, application Germany, Dec. 20, 1974, 7442379[U]

Int. Cl.[2] A61B 17/32

U.S. Cl. 128—303.15 7 Claims

1. A resectoscope comprising:

a. a barrel,

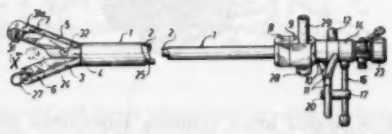
b. a guide tube in and secured to said barrel,

c. said barrel having

i. an end portion which is at a distal end region of the resectoscope and which is inclined at an angle with respect to the direction of said barrel,

d. an inner tube for receiving an optical system to be passed therethrough, said inner tube extending through said guide tube,

e. said inner tube having



i. an end portion which is at a distal end region of the resectoscope and which is inclined at an angle with respect to the direction of said inner tube,

f. forceps comprising

i. two jaws which are constituted respectively by the angled end portions of said barrel and inner tube, and

ii. a scissors grip comprising two limbs which are connected respectively to said barrel and inner tube at a proximal end region of the resectoscope,

g. a conductive cutting loop carried by one of said jaws to be co-operated with by the other of said jaws, and

h. electrical connection means for said cutting loop.

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4,024,870

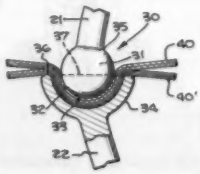
## NO-TEAR TOWEL CLAMP

Dan Sandel, 17000 Cotter Place, Encino, Calif. 91436

Filed Dec. 31, 1975, Ser. No. 645,621

Int. Cl.[2] A61B 17/28

U.S. Cl. 128—321 2 Claims



1. In a surgical towel and drape clamp having opposing jaw members connected to and opened and closed by the action of pivotally interconnected shank members having finger loop members and locking ratchet members and said jaw members further having tip means for holding and clamping surgical drapes, surgical towels and the like, the improvement in said tip means comprising the provision of:

a blunt hemispheric distal end portion on one of said tip means; and

a concave hemispheric distal end portion having a peripheral blunt edge on the other of said tip means,

whereby, upon placing a surgical drape between said tip

means and manipulating said finger loops to close said jaw members and locking ratchets, said drape is trapped between said blunt hemispheric distal end portion and said concave hemispheric distal end portion.

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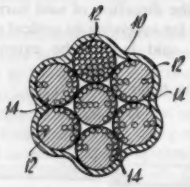
**4,024,871**

## ANTIMICROBIAL SUTURES

**Martin Stephenson, Peterborough, Canada, assignor to Ethicon, Inc., Somerville, N.J.**

**Filed July 23, 1975, Ser. No. 598,459**
**Int. Cl.² A61L *17/00*; A61K *27/12***
**U.S. Cl. 128—335.5** **16 Claims**



**1.** A surgical suture exhibiting antimicrobial properties comprising a multifilament suture strand impregnated with an antimicrobial agent and its entire surface coated with a substantially continuous layer of a segmented polyurethane, said polyurethane initially being free of antimicrobial agent.

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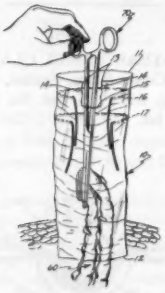
**4,024,872**

## COLOSTOMY DEVICE AND METHOD

**James P. Muldoon, 1942 Sherman, SE., East Grand Rapids, Mich. 49506**

**Filed June 1, 1976, Ser. No. 691,346**
**Int. Cl.² A61M *25/00***
**U.S. Cl. 128—348** **16 Claims**



**1.** A method for drawing a colostomy spur or like body organ through a body incision which is sufficiently small relative to said spur that intimate contact between the surface of said spur and the perimeter of said incision would normally occur during the normal drawing operation, said method eliminating said contact and comprising: slipping a flexible, sterile plastic sleeve over the end of the transected colostomy spur so that said sleeve extends from approximately the end of said spur a distance along the length thereof sufficient to allow the sleeve covered spur to be pulled through the relatively small, body incision with only said sleeve making contact with the perimeter of said incision; drawing said sleeve and sleeve covered colostomy spur through said relatively small incision whereby traumatic contact between said perimeter of said incision and said colostomy spur is eliminated; removing said sleeve by sliding said sleeve completely through said incision and off said spur over the end thereof.

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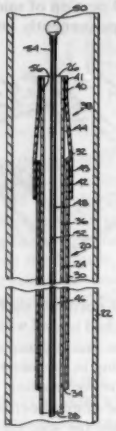
**4,024,873**

## BALLOON CATHETER ASSEMBLY

**William T. Antoshkiw, Clifton, and Thomas A. Ursic, Hasbrouck Hts. both of N.J., assignors to Becton, Dickinson and Company, East Rutherford, N.J.**

**Filed May 24, 1976, Ser. No. 689,487**
**Int. Cl.² A61M *25/00***
**U.S. Cl. 128—349 B** **11 Claims**



**1.** A balloon catheter comprising; two concentric tubes with distal and proximal ends and with the inner tube being spaced from the inner wall of the outer tube, one of the tubes having its distal end extending beyond the distal end of the other tube and the tubes being axially displaceable with respect to one another, an inflatable balloon with one end thereof mounted on the distal end portion of one of the tubes and its other end mounted on the distal end portion of the other of the tubes so as to seal the balloon from the exterior of the tubes, one of the tubes being open at both ends to permit access therethrough from end to end and the other tube having its distal end in communication with the interior of the balloon and its proximal end adapted to be connected to a source of fluid for expanding the balloon.

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**4,024,874**

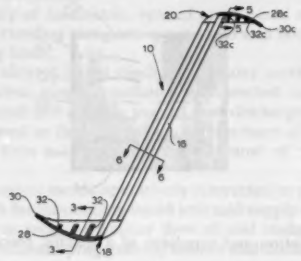
## EXTRACTION DEVICE FOR BLOCKED WINDPIPES

**Allen Pumill Klippel, Clayton, Mo., assignor to Rescue Products, Inc., St. Louis, Mo.**

**Filed Sept. 30, 1975, Ser. No. 618,183**
**Int. Cl.² A61B *17/24***
**U.S. Cl. 128—356** **3 Claims**

**1.** An integral one-piece plastic extraction device for food or other article blocked windpipes, comprising an elongated handle portion having each free end thereof being provided with a ribbed spoon bowl portion, said ribbed spoon bowl portions extending in generally opposite directions from the elongated handle portion and at an obtuse angle in a direction away from the middle thereof, each of said ribbed spoon bowl portions having sidewalls that taper convergently from the elongated handle portion to a rounded free end portion and a bottom wall which comprises a shallow curving section ex-

tending from the elongated handle portion to a tip portion in the area of juncture with the rounded free end portion, said tip



portion extending above the sidewalls of each ribbed spoon bowl portion.

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**4,024,875**

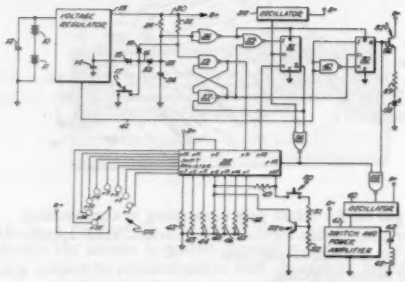
**DEVICE FOR NON-INVASIVE PROGRAMMING OF IMPLANTED BODY STIMULATORS**

**James J. Putzke, New Hope, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.**

**Filed Sept. 19, 1975, Ser. No. 614,794**

**Int. Cl.² A61N *1/36***

**U.S. Cl. 128—419 PG** **18 Claims**



**1.** In a device for programming an implantable body stimulator through transmitted pulses of radio frequency energy of the type having power supply means, means powered by said power supply means for generating a preselected transmitted signal of radio frequency energy and means for initiating the operation of said generating means, the improvement which comprises means responsive to said initiating means for enabling said power supply means during an interval of predetermined duration following the initiating of operation of said generating means.

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**4,024,876**

**PROSTHETIC BRASSIERE**

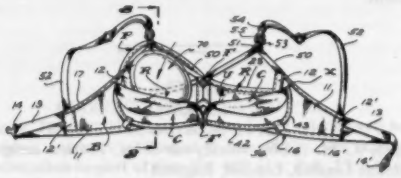
**William B. Penrock, 4426 Lankershim Blvd., North Hollywood, Calif. 91602**

**Filed June 2, 1975, Ser. No. 583,103**

**Int. Cl.² A41C *3/10*; A61F *1/00***

**U.S. Cl. 128—472** **4 Claims**

**1.** A prosthesis and breast supporting brassiere comprising a body-encircling band structure having rear ends with interengageable means and adapted to be joined at the back of the user and having a front portion defining and provided with a pair of laterally spaced, laterally extending upwardly opening breast and prosthesis receiving and supporting pockets, separate means for providing equalized vertical support for each of said pockets including a shoulder strap having a rear end attached to the rear end portion of the band related to the pocket and a front end portion at the front of the user and defining a loop and a second strap having ends attached to the upper edge of the band at the opposite ends of the pocket and extending upwardly into sliding engagement through said loop, resilient means carried by the portions of the band adjacent each pocket constantly operative to apply a vertical spreading bias in and through said portions of the band and applying a lifting bias along a portion of a line defined by the junction of the breast and body engaging surfaces of the band, a pair of laterally spaced substantially forwardly projecting, rearwardly opening semi-conical breast and prosthesis covering and forming cups, each arranged forward of one of said pockets and having substantially laterally outwardly and upwardly extending outer lower edge portions adjacent and fixed to related outer lower edge portions of the cup, laterally substantially inwardly and upwardly extending inner lower edge portions terminating adjacent an upper edge of the band at the



center thereof and having substantially upwardly convergent upper inner and outer edge portions extending from the inner and outer ends of the pocket toward the front end portions of the shoulder strap related thereto, releasable coupling means between the junction of said upper inner and outer edge portions of each cup and the shoulder strap related thereto, and a substantially flat vertical rear panel corresponding in general vertical rear plane configuration with each cup with which a prosthesis is related and positioned rearward of the cup and its related portions of the band in overlying relationship with the open rear of the cup and having edge portions adjacent the band fixed to the band, the upper and lower inner edge portions of the cups converge and are joined adjacent the upper central edge portion of the band and further including releasable fastening means between the central portion of the band and the area or joinder between the cups.

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**4,024,877**

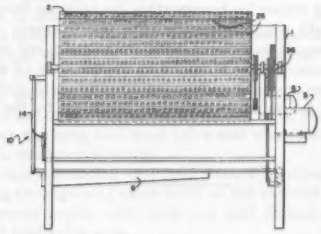
**VEGETABLE PEAS AND SEPARATING THE HULLS THEREFROM AND THE LIKE**

**Woodrow W. Welborn, Rte. No. 3, Laurel, Mich. 39440**

**Filed Mar. 4, 1975, Ser. No. 555,675**

**Int. Cl.² A01D *91/00***

**U.S. Cl. 130—30 H** **2 Claims**



**1.** Method of accepting vegetable bodies containing desired vegetable components distinguished by being under a given predetermined radial dimension and unsavable vegetable bodies comprising the steps of: introducing the unseparated vegetable components and vegetable bodies into a motor driven drum having a shaft through a removable hatch, tumbling a selected group of vegetable bodies within the driven

drum, agitating groups of vegetable bodies within said drum by an essentially coaxially rotating agitating element driven by a variable speed motor to shell or detach the vegetable bodies from the desired vegetable components, separating the vegetable bodies from the desired vegetable components by sets of separating elbow shaped passage ways extending inwardly of the interior of said drum and disposed throughout the periphery of the drum for passage of the vegetable components away from the vegetable bodies which remain within the drum, the speed of the driven drum being at a different rate than the speed of the rotating agitating element, collecting the desirable vegetable components within a shaker trough positioned essentially below the drum, and shaking the shaker trough by a cam operating mechanism attached to the shaft of the motor driven drum, the rate of rotation of the motor drum being distinctly different from that of the rotation of the agitating element.

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**4,024,878**

## CIGARETTE MAKING MACHINES

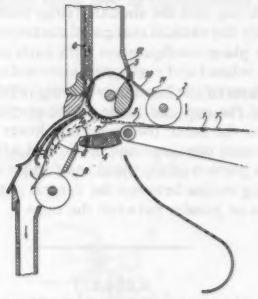
**Francis A. M. Labbe, Neuilly-sur-Seine, France, assignor to Molins Limited, London, England**

**Filed Jan. 29, 1976, Ser. No. 653,327**

**Claims priority, application United Kingdom, Feb. 1, 1975, 4439/75**

**Int. Cl.² A24C** *5/18*

**U.S. Cl. 131—84 B** **9 Claims**



1. In a continuous-rod cigarette-making machine with a suction conveyor on which a tobacco filler is formed in which tobacco is thrown as separated particles in a generally horizontal direction across a rising airstream in a winnowing zone so that said airstream entrains the tobacco and carries it up to the lower face of said suction conveyor, and with a hopper and conveying means for transporting the tobacco from said hopper to said winnowing zone, the improvement comprising sealing means associated with said conveying means, said sealing means being arranged to oppose flow of air between the hopper and the winnowing zone so as to reduce disturbance of the tobacco during its transport by the conveying means.

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**4,024,879**

## STICK-A-BROW

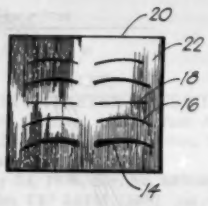
**Sylvia A. Stryker, 1993 Beech St., Wantagh, N.Y. 11793**

**Filed Oct. 16, 1975, Ser. No. 623,044**

**Int. Cl.² A45D** *40/30*

**U.S. Cl. 132—88.5** **10 Claims**

1. A beauty kit comprising a card of semiflexible material, the back of which is covered by an adhesive, and the front of which has hair attached, the card being preimpressed in specific shapes such as eyebrows, the preimpression permitting




ready separation and expulsion of a specific piece from the card.

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**4,024,880**

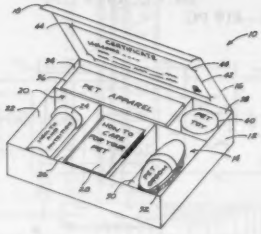
## INFANT PET ARRIVAL KIT

**Edward Ray Newton, and Maria Louise Newton, both of 70 Muir St., Eureka, Mo. 63025**

**Filed July 12, 1976, Ser. No. 704,622**

**Int. Cl.² A45D** *40/00*

**U.S. Cl. 132—79 F** **10 Claims**



1. A gift kit for infant pets comprising in combination:
a. container means for containing various items appropriate for the particular pet; and
b. the items including:
i. items relating to the comfort and care of pet; and
ii. at least one item of novelty and amusement.

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**4,024,881**

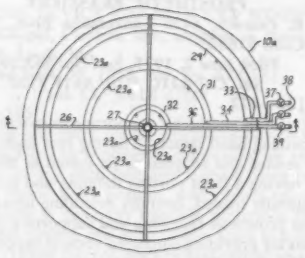
## APPARATUS FOR REMOVING GELATINOUS SLUDGE AND SOLIDS FROM SETTLING BASINS

**Henry J. Weiland, Birmingham, and Dewey W. Black, Tarrant City, both of Ala., assignors to Environment Improvement Systems, Inc., Birmingham, Ala.**

**Filed Jan. 22, 1976, Ser. No. 651,520**

**Int. Cl.² B08B** *3/02*

**U.S. Cl. 134—104** **3 Claims**



1. Apparatus for transferring gelatinous sludge and solid

sedimentations along the bottom of a settling basin and removing the same at a discharge point located centrally of said apparatus comprising:

a. plurality of concentric, spaced apart liquid supply conduits extending along and superjacent said bottom of said settling basin,

b. a plurality of liquid discharge nozzles carried by said concentric supply conduits and directed substantially horizontal and radially toward said discharge point and positioned so that there is no impingement of streams of liquid from said nozzles on the bottom of the settling basin,

c. fluid control means operatively connected to each supply conduit for introducing liquid into said supply conduits at a rate to produce laminar flow of said sludge and said sedimentations progressively toward said discharge point, and

d. means to remove said sludge and sedimentations at said discharge point.

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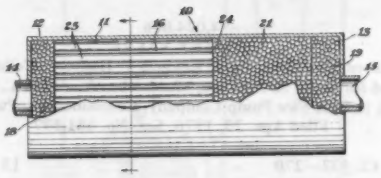
**4,024,882**

## VALVE AND METHOD FOR AQUEOUS SYSTEMS

**Daniel H. Haigh, Sanford, and Richard H. Hall, Midland, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed May 5, 1976, Ser. No. 683,346**
**Int. Cl.² B01D *13/00***
**U.S. Cl. 137—2** **8 Claims**



1. In a method for the handling of an aqueous stream wherein the stream is passed through a conduit, the stream being subject to contamination with an organic liquid, interposing within the conduit a body of swellable polymer, the body being permeable to the aqueous stream and being retained within the conduit, the body being swellable by an organic liquid to a degree sufficient to stop flow within the conduit, the improvement which comprises disposing within the stream at an upstream location from the swellable polymer body, an organic liquid softenable polymer body, the softenable polymer body on contact with an organic liquid being deformable and collapsible to thereby at least partially seal interstitial spaces defined by the body of swellable polymer.

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**4,024,883**

## FLOW ADDITIVE SUSPENSION SYSTEM

**Ali Caglar Akgungor, Lachine, and Ertugrul Bilgen, Pointe Claire, both of Canada, assignors to Canadian General Electric Company Limited, Toronto, Canada**

**Filed Oct. 31, 1973, Ser. No. 411,213**
**Claims priority, application Canada, Dec. 8, 1972, 158494**
**Int. Cl.² F17D *1/16***
**U.S. Cl. 137—5** **4 Claims**

1. The process of adding to a main body of water an additive substance in predetermined concentration as a stable quantitively determinable liquid mixture selected from the group consisting of quar gum, and polyacrylamide and polyethylene oxide having the property of maintaining Newtonian flow characteristics in an extended flow velocity range, by mixing said selected additive substance in a liquid vehicle suited for selective dosage administration, including the steps of bringing together a mass of said selected substance in controlled mechanical dispersion with a mass of compatible mixing liquid having substantially neutral density in relation thereto, and possessing a determinable electrical characteristic related to the concentration thereof, said compatible mixing liquid being a salt solution consisting of a 25% by weight solution of sodium chloride in water where said additive substance is polyethylene oxide and a 30% by weight solution of sodium carbonate in water where said additive substance is guar gum or polyacryamide, turbulating the components to provide a substantially homogeneous stable and pumpable mixture having a low rate of precipitation, diluting the substance to a further extent by addition thereof to said main body of water, determining the electrical conductivity of the diluted mixture as an analog of the content of said additive substance and using said conductivity as a feed back signal to control the rate of addition of said mixture in response to the signal to achieve a desired concentration of said additive in said main body of water.

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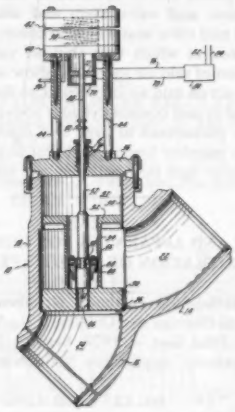
**4,024,884**

## CLOSING ASSIST FOR VALVES

**Norman F. Prescott, Wenham, and Herbert Cook, Revere, both of Mass., assignors to Atwood & Morrill Co., Salem, Mass.**

**Continuation-in-part of Ser. No. 490,616, July 22, 1974, abandoned. This application Feb. 9, 1976, Ser. No. 656,666**
**Int. Cl.² F16K *31/12***
**U.S. Cl. 251—38** **4 Claims**



1. A shut-off valve for use in a line carrying steam under pressure comprising:

a valve body;

an inlet in said valve body;

an outlet in said valve body;

a circular main valve seat between said inlet and said outlet;

a cylindrical section in said valve body coaxial with and spaced from said valve seat;

a closure member slidably engaged in said cylindrical section on the upstream side of said valve seat, said closure member engaging said main valve seat when said shut-off valve is in closed position;

a valve stem connected with said closure member and extending through said valve body to the exterior thereof;

spring means urging said stem and said closure member toward said valve seat;

a power cylinder rigidly connected to said valve body above said body said power cylinder being concentric with said cylindrical section;

a power piston slidably mounted within said power cylinder;

a piston rod connected to said piston and extending downward from said piston and through said power cylinder, said piston rod being connected at its bottom to said stem;

a control cylinder, rigidly connected with said power cylin-

der, intermediate said power cylinder and said valve body;

a pilot valve port extending downward through said closure member;

a pilot valve seat on the upper end of said pilot passage;

a pilot valve at the lower end of said stem, said closure member being connected to said stem for limited sliding movement, said pilot valve engaging said pilot valve seat when said stem is displaced to the limit of its movement relative to said closure member in the direction of said pilot passage, said pilot valve being disengaged from said pilot valve seat when said stem is displaced to the limit of its movement relative to said closure member in the direction away from said pilot valve port;

a control piston slidably mounted within said control cylinder and connected to said piston rod;

a first oil line connected to said control cylinder above said control piston;

an air-oil booster connected with said first oil line;

a second oil line connected to said control cylinder below said control piston;

an oil valve connected between said first oil line and said second oil line so that when said oil valve is closed oil will flow only through said first oil line;

an air-oil booster connected with said first oil line;

a first air line carrying air under pressure, said first air line being connected to said air-oil booster;

whereby air pressure in said power-cylinder below said power piston can be released so that said spring means will move said valve stem and said closure member toward said valve seat with said control cylinder regulates the speed at which said shut-off valve can be closed, actuation of said air valve will allow air from said first air line to act on said air-oil booster so that oil in said first oil line and in said control cylinder above said control piston will be pressurized to urge said control piston and said closure member toward said seat to close said valve and to prevent fluid flow between said inlet and said outlet.

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**4,024,885**

## PROCESS AND APPARATUS FOR CONTROLLING THE CONCENTRATION OF DIAZOTYPE DEVELOPING LIQUID

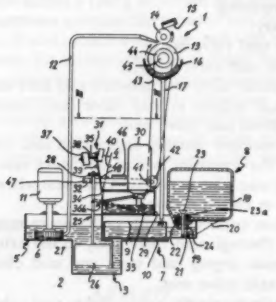
**Theodoor Hillebrand Linthout, Grubbenvorst, Netherlands, assignor to Océ-van der Grinten N.V., Venlo, Netherlands**

**Filed Sept. 4, 1974, Ser. No. 503,173**

**Claims priority, application Netherlands, Sept. 10, 1973, 7312422**

**Int. Cl.² G05D *11/02***

**U.S. Cl. 137—91** **5 Claims**



**1.** An apparatus for controlling the concentration of a reserve supply of a diazotype developing liquid containing at least one azo coupling component and electrolyte dissolved in a solvent, including a receptacle for holding said liquid supply and means for delivering liquid from said receptacle to the development zone of a semi-dry diazotype developing apparatus, the combination which comprises a first container holding a body of said solvent, a second container holding a body of a liquid developer concentrate containing said at least one azo coupling component and said electrolyte at a concentration substantially greater than that of said developing liquid, means responsive to a lowering of the volume of said liquid supply below a certain level in said receptacle for delivering solvent from said first container into said receptacle until the liquid therein is restored to said level, a hydrometer immersed in the liquid of said supply so as to float therein at a certain elevation when the specific gravity of said liquid corresponds to the required concentration thereof, and means activated in response to a sinking of said hydrometer in said liquid to a location below said certain elevation for dosing quantities of said concentrate from said second container into said receptacle, said hydrometer comprising a buoyant body immersed in said supply liquid, a rod extending upwardly from said buoyant body and an enlargement on said rod above said liquid level, said dosing means comprising a reciprocable displacing element and drive means for reciprocating said element in a substantially horizontal path, said enlargement lying outside the path of said element when said hydrometer is at said certain elevation and lying in said path so as to be engaged and displaced laterally by said element in each reciprocation of said element upon said sinking of said hydrometer, and means operated upon each lateral displacement of said enlargement by said element for dispensing a quantity of said concentrate from said container into said receptacle.

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**4,024,886**

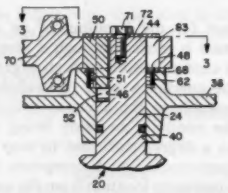
## ROTARY VALVE

**H. Alfred Eberhardt, Paoli; Kenneth F. Hoffman, Collegeville, and Raymond R. Petersen, Meadowbrook, all of Pa., assignors to Hale Fire Pump Company, Conshohocken, Pa.**

**Filed Apr. 29, 1976, Ser. No. 681,597**

**Int. Cl.² F16K *31/52***

**U.S. Cl. 137—270** **13 Claims**



**1.** A valve comprising: a body having an inlet and an outlet, a valve member rotatable within said body to various positions to control the flow between said inlet and said outlet, a cover mounted on said body and having a bore therein, said valve member having a shaft portion extending through said bore in said cover to the exterior of the valve, a handle having a bore receiving said shaft portion therein, a longitudinally extending slot formed on the periphery of said shaft portion, said handle having a keyway formed therein in opposed relation with said slot in said shaft portion, a key received in said slot in said shaft portion and in said keyway providing a lost motion connection between said handle and said shaft portion, an annular recess in said cover encircling said shaft portion in the region of said slot therein, a coil spring mounted in said recess under a tensioned condition in contact with the outer wall of said recess, said coil spring having a tang formed at each end thereof, one of said tangs extending into said slot between said key and one side wall of said slot, the other of said tangs extending into slot between said key and the other side wall of said slot, said tangs being constructed and arranged to be moved in a direction to decrease the coil diameter of said coil spring in response to the rotating movement of said key by said handle and to be moved in a direction to increase the coil

diameter of said spring in response to rotating movement of the side walls of said slot on said shaft portion.

11. A valve comprising a body having an inlet and an outlet, a valve member rotatable within said body to various positions to control the flow between said inlet and said outlet, said valve member having a shaft portion extending to the exterior of the valve body, a handle having a bore receiving said shaft portion therein, a longitudinally extending slot formed in the periphery of said shaft portion, and a key received in said slot in said shaft portion, said handle having four circumferentially equally spaced keyways each adapted to receive said key, said keyways being arranged in two pairs of oppositely disposed keyways, one pair of said oppositely disposed keyways being centered on a line which extends at an acute angle to the longitudinal axis of said handle.

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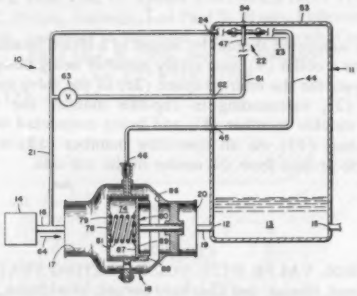
## 4,024,887
## AUTOMATIC VALVING SYSTEM

Ronald W. McGregor, Arlington, Tex., assignor to Vought Corporation, Dallas, Tex.

Filed Nov. 24, 1975, Ser. No. 634,980
Int. Cl.² F15C 1/14
U.S. Cl. 137—386 7 Claims



1. A valving system for permitting substantial liquid flow into a tank upon the level of liquid within the tank being below a predetermined level and for preventing any substantial liquid flow into the tank upon the level of liquid within the tank being above the predetermined level, the valving system comprising:

a liquid sensor comprising first, second, and third fluid nozzles and means immovably supporting the nozzles within the tank, the first and second nozzles being substantially coaxially aligned, positioned above the predetermined level, and directioned toward each other, the third nozzle being positioned below the predetermined level, between the first and second nozzles, and directioned toward the common axis of the first and second nozzles;

a unidirectional valve having an inlet, an outlet, and a port, the valve comprising a means normally permitting liquid flow between the inlet and outlet and, alternatively, for preventing liquid flow upon the valve port receiving liquid under a pressure above a predetermined level relative to the pressure or liquid received through the inlet;

a first conduit having a first end connected to the valve inlet and a second end connectable to a source of liquid under pressure;

a second conduit communicating between the valve outlet and the interior of the tank;

a third conduit providing communication between the first nozzle of the liquid sensor and the first conduit and valve inlet and comprising a means for conducting liquid under pressure from the first conduit to the first nozzle to cause a jet of liquid to be ejected from the first nozzle toward the second nozzle with sufficient force to impinge upon the second nozzle;

a fourth conduit communicating between the second nozzle and the valve port and comprising a means for conducting liquid under pressure from the second nozzle to the valve port upon liquid under pressure being received by the second nozzle from the first nozzle, the valve comprising a means preventing liquid flow from its inlet to its outlet upon liquid pressure being received through the fourth conduit upon fluid ejected from the first nozzle being received by the second nozzle; and

a fifth conduit communicating between the third conduit and the third nozzle, the third nozzle comprising a means for ejecting liquid received from the fifth conduit toward the jet of liquid ejected from the first nozzle for diverting the jet from the second nozzle upon the third nozzle being above the level of liquid within the tank, whereby the valve remains open and, alternatively upon the level of liquid within the tank rising to the predetermined level, for dissipating liquid received from the fifth conduit, whereby the liquid jet ejected from the first nozzle is permitted to impinge upon the second nozzle for effecting operation of the valve to prevent liquid flow from its inlet to its outlet.

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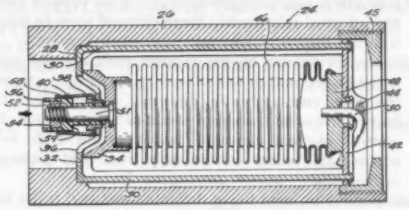
## 4,024,888
## EVAPORATOR PRESSURE REGULATOR

Henry Jacyno, Franklin, Wis., assignor to The Singer Company, New York, N.Y.

Continuation of Ser. No. 519,853, Nov. 1, 1974, abandoned.
This application Feb. 2, 1976, Ser. No. 654,465
Int. Cl.² F16K 21/06
U.S. Cl. 137—514 9 Claims



1. A pressure regulating valve including a housing having an inlet and an outlet,

a valve seat in the housing between the inlet and the outlet and having a valve orifice inside the seat,

a bushing fixed on the centerline of the seat on the inlet side of the seat,

a poppet valve located on the outlet side of the seat with its face exposed to the inlet pressure and cooperating with the seat to regulate flow,

a sealed bellows located on the outlet side of the seat and having one end fixed relative to said seat and the other end connected to said valve,

means in said bellows holding the valve on the seat until the force of the inlet pressure acting on the valve face exceeds the force of said means,

a shaft projecting from the valve face through the bushing,

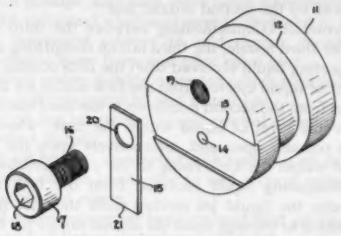
a self-lubricating sleeve on the shaft extension,

a spring having spring arms acting on opposed sides of the sleeve and imposing greater resistance to valve movement from a static condition than the resistance to continuous movement to thereby damp movement of the valve in response to pressure pulsations acting on the bellows.

## 4,024,889
## DYNAMIC CONTROL VALVE FOR MODIFYING FLUID FLOW

Paul D. Smith, 721 Anita St., Redondo Beach, Calif. 90278, and Phillip Mannes, 23331 Audrey St., Torrance, Calif. 90503

Filed May 14, 1974, Ser. No. 469,365
Int. Cl.² F16K *15/14*
U.S. Cl. 137—517 5 Claims



1. A control valve for dynamically adjusting fluid flow through a conduit comprising the combination of:

a valve body disposed in said conduit for interferring with the flow of a working fluid under pressure;

a resilient seal carried on said valve body between said valve body and said conduit to prevent fluid leakage therebetween;

said valve body having an upstream face provided with a shaped recess extending thereacross so as to divide said body face into a pair of raised body portions separated by said recess;

said valve body having at least one passageway extending through said valve body for conducting said fluid flow and said passageway having an orifice opening into said upstream face within said recess defined by said pair of raised body portions;

a deflectable control element bridging said recess and disposed over said passageway orifice so as to be in variable spaced apart relationship therewith and so as to interfere with the fluid flow into said passageway orifice;

said control element having opposite ends wherein one end is rigidly secured to one of said raised body portions and the other end is slidably disposed on said other raised body portion and wherein a mid-section portion of said control element between said opposite ends bridges across said recess immediately over said passageway orifice; and

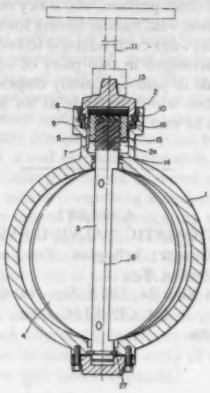
said control element being deflectable at said is flat having its mid-section portion parallel to said recess under a condition of no fluid flow of said working fluid through said conduit. portion and said passageway orifice whereby said dimensional area modifications directly influence the conduction of said working fluid flow passing through said fluid flow area between said control element and said passageway orifice.

## 4,024,890
## ROTARY VALVE

Masahiro Yasuoka, Hirakata, Japan, assignor to Kuboto Tekko Kabushiki Kaisha, Osaka, Japan

Filed May 15, 1975, Ser. No. 577,932
Claims priority, application Japan, May 17, 1974, 49-55941; Oct. 7, 1974, 49-121459[U]
Int. Cl.² F16K *37/00*
U.S. Cl. 137—556.3 4 Claims

1. An actuating device for a rotary slide valve in which a rotatable valve stem, disposed in a valve case so as to be immovable in axial direction and supporting a rotary valve disk, engages via a coarse thread at its upper end with a slidable member, which is guided so as to be movable in an axial direction within a hollow cylindrical valve case projection, said slidable member in turn engaging with a fine thread provided at its outer periphery with a rotary member, which is non-slidably supported by the valve case projection and rotatable by means of a hand wheel, characterized in that the hollow cylindrical internal space (2*a*) of the valve case projection (2) accepts, in addition to the upper end of the valve stem (3) and the slidable member (5), also the rotary member (6),

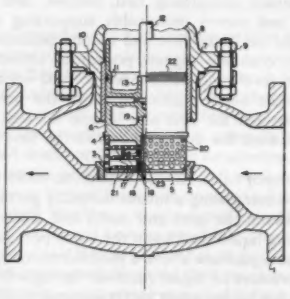


which is supported therein by means of a thrust bearing (10) as well as a collar (9), said rotary member being designed as a top cover for the internal space (2*a*) of the valve case projection (2), surrounding in cap-like manner the tubular shaped slidable member (5), and being connected with the hand wheel (11) via an operating member (13) which is shaped to project from the center of the top side.

## 4,024,891
## CONTROL VALVE WITH NOISE ABATING FEATURES

Hans Engel, Hanau, and Eberhard Sorger, Muehlheim, both of Germany, assignors to Honeywell Inc., Minneapolis, Minn.

Filed June 23, 1975, Ser. No. 589,788
Claims priority, application Germany, Apr. 18, 1975, 2431322
Int. Cl.² F16K *1/54*, *47/04*
U.S. Cl. 137—625.3 7 Claims



1. A fluid control valve including a body having a fluid inlet passageway, a fluid outlet passageway, and a first seat means located between said passageways and defining with the latter a fluid flow path through said body, said valve also including a noise abating throttling plug arranged for movement along its axis and within said first seat means between closed and open positions, said plug comprising

a second seat means which sealingly engages said first seat

means to close said flow path when said plug occupies said closed position,

a perforated throttling sleeve which moves axially within said first seat means, to open an increasing number of the perforations of said sleeve to said flow path, as said plug is moved from said closed position to said open position, and

a plurality of perforated discs mounted within said sleeve in spaced relation along and substantially normal to the axis thereof, each of said discs extending completely throughout the cross-sectional area of said sleeve to cause the fluid passing through said sleeve perforations to pass through configurations of all of the perforations in said discs, which configurations vary as said plug is moved between said positions,

whereby the fluid in said flow path passes through configurations of said sleeve and disc perforations which vary, as said plug is moved between said positions, to form varying restrictive fluid passageway combinations for the fluid in said flow path as necessary to corrresponding vary the fluid pressure drops effected along said flow path while minimizing the noise created by the passage of said fluid along said flow path.

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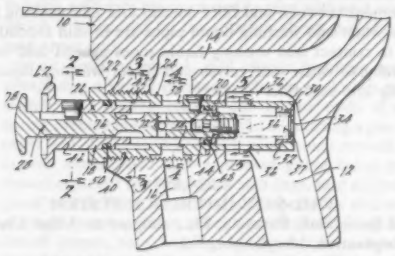
**4,024,892**

## VALVE FOR USE IN A NUT INSTALLATION TOOL

**Robert C. Prisco, Anaheim, and Paul D. Myers, Fullerton, both of Calif., assignors to Microdot, Inc., Greenwich, Conn.**

**Filed Mar. 8, 1976, Ser. No. 664,653**
**Int. Cl.² F16K *11/14***
**U.S. Cl. 137—630.14** **3 Claims**



1. A torque-indicating dual trigger valve mechanism for use with a power-operated nut runner of the air-actuated type comprising:

an elongated sleeve forming a dual trigger housing, said sleeve having an elongated bore therethrough, inlet and outlet ports formed in said housing in longitudinally spaced relation;

first and second co-axial elongated triggers disposed within said housing for longitudinal movement relative to said housing and with respect to each other;

said first trigger embracing said second trigger and having an elongated port formed therein communicable with said inlet and outlet ports in said sleeve;

said second trigger independently and slidably disposed within said first trigger, restrictive ports formed adjacent the inner end of said second trigger communicable with said inlet port in said sleeve and communicable with said outlet port in said sleeve through said elongated port in said first trigger when said second trigger only is in depressed position, means to adjustably restrict air flow through said restrictive ports;

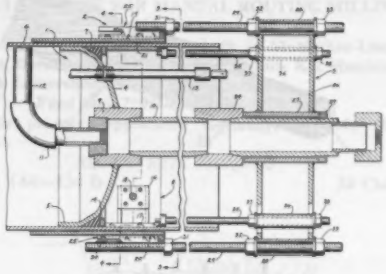
said second trigger having a passage spaced from said restrictive ports communicable with said inlet port and said outlet port when both first and second triggers are depressed to deliver full air flow through said outlet port.

**4,024,893**

## PIPE PROOF TEST FIXTURE

**Robert M. Jackman, and William N. McDonald, both of Little Rock, Ark., assignors to A. O. Smith-Inland, Inc., Milwaukee, Wis.**

**Filed Jan. 21, 1976, Ser. No. 651,137**
**Int. Cl.² F16L *55/12***
**U.S. Cl. 138—89** **10 Claims**



1. A fixture for closing the end of a large diameter thin walled pipe, comprising an internal expansible closure assembly adapted to seal against the inner wall of the pipe, an external contractible clamping assembly adapted to be secured on the outside of the pipe in the region of said first named assembly, a separate yoke removably carried by said first named assembly, and adjusted means removably securing said yoke to said second assembly.

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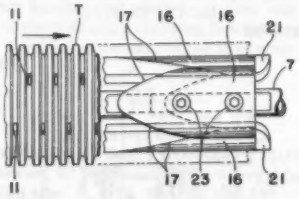
**4,024,894**

## PERFORATED CORRUGATED TUBE AND METHOD AND APPARATUS FOR MANUFACTURING THE SAME

**Hubert Drossbach, 8852 Rain am Lech, Germany**

**Continuation of Ser. No. 384,121, July 30, 1973, abandoned. This application Mar. 17, 1975, Ser. No. 558,949**
**Int. Cl.² F16L *11/11***
**U.S. Cl. 138—121** **1 Claim**

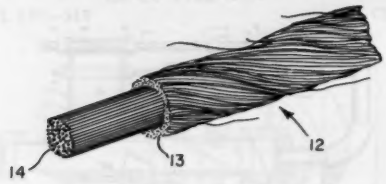


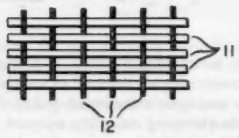
1. A molded seamless corrugated plastic tube having circumferentially spaced apart perforations through the valleys of the corrugations, said perforations being of generally rectangular form elongated in the circumferential direction and being characterized in that said perforations are defined by side and end walls which comprise molded surfaces extending through the entire radial wall thickness of said valleys and converging toward the interior of the tube, and in that the radially inner surfaces of said side and end walls which bound said perforations are sheared surfaces extending axially of said tube at a diameter no greater than the minor diameter of said corrugations.

## 4,024,895
## PRODUCT REINFORCING FABRIC AND TWO-COMPONENT WEFT YARN USEFUL THEREIN

Eugene R. Barron, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 24, 1976, Ser. No. 670,077
Int. Cl.² D02G 3/48; D03D 15/00
U.S. Cl. 139—426 R 8 Claims




1. In a reinforcing fabric having a web of tire cords maintained in spaced relationship by weft yarns, an improved weft yarn comprising a cotton sheath twisted about a core of spin-oriented polyester filaments, which yarn has an initial modulus of at least 15 grams per denier and a break elongation of 100 to 150 percent when tested before heating, and which has an initial modulus of at least 15 grams per denier and a break elongation of at least 75 percent when tested after heat aging 450° F for 2 minutes.

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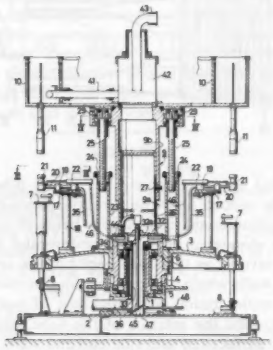
## 4,024,896
## WASHING DEVICE FOR ROTARY FILLING MACHINE

Yoshiji Ishioka, Kanazawa, and Jyuro Kawamura, Uchinada, both of Japan, assignors to Shibuya Kogyo Company, Ltd., Kanazawa, Japan

Filed Nov. 26, 1975, Ser. No. 635,643
Claims priority, application Japan, May 13, 1975, 50-56318; May 27, 1975, 50-63222; June 10, 1975, 50-69882
Int. Cl.² B65B 3/04
U.S. Cl. 141—90 24 Claims



1. In a machine for filling liquid into containers, comprising a rotatable support mounted for rotation around a vertical axis; a plurality of tables mounted in a circular array on said support for rotation therewith so that said tables move through a circular path, said tables being adapted to support containers; a plurality of downwardly extending filler nozzles, each nozzle being disposed in vertical alignment with one of said tables and being spaced vertically upwardly therefrom, means supporting said filler nozzles for rotation around said vertical axis conjointly with said tables so that said filler nozzles move through said circular path, said filler nozzles having normally closed valves therein which valves are adapted to be opened when containers supported on said tables are brought into contact with said nozzles; and means for effecting relative vertical movement between said tables and said filler nozzles as said tables and said nozzles move through said circular path so that during a portion of the conjoint movement of said tables and said nozzles through said circular path the containers supported on said tables are disposed in positions adjacent said nozzles whereby the valves in said nozzles are opened and said containers are filled with liquid and in the remainder of said circular path the containers are vertically spaced downwardly from said nozzles and the valves in said nozzles are closed, the improvement which comprises: a plurality of upwardly opening washing liquid pipes arranged in a circular array with there being one washing liquid pipe for each one of said filler nozzles, said washing liquid pipes being mounted for cojoint rotation around said vertical axis with said filler nozzles and said tables; means for supplying washing liquid to said washing liquid pipes; means for moving said washing liquid pipes between a first position wherein said washing liquid pipes are disposed out of vertical alignment with said filler nozzles and said tables so as not to interfere with movement of said filler nozzles and said tables, and a second position wherein each of said washing liquid pipes is disposed in vertical alignment with and is disposed between a filler nozzle and its associated table; and means for effecting relative vertical movement between said filler nozzles and said washing liquid pipes when said washing liquid pipes are in said second position to contact said washing liquid pipes against said nozzles whereby to open said valves and direct washing liquid upwardly into said filler nozzles.

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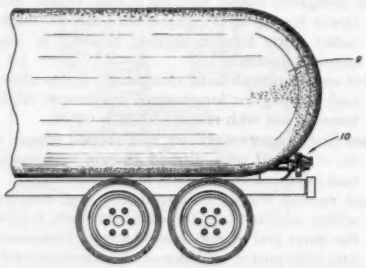
## 4,024,897
## FAIL-SAFE INTERLOCK SYSTEM

Loyd Reese Hall, Sarasota, Fla., assignor to Allied Chemical Corporation, Morristown, N.J.

Filed Sept. 18, 1975, Ser. No. 614,450
Int. Cl.² B65B 3/04, 57/00
U.S. Cl. 141—392 8 Claims




1. In combination with a truck having a filler valve for the loading of product, said filler valve having a free end adapted for connection to a loading hose, said loading hose being permanently fixed at its other end to a supply line which leads from a bulk storage tank line, said truck having an ignition circuit, the improvement comprising:

A. support means on said truck, said support means com-

prising a portion of said filler valve which does not connect with said loading hose;

B. mounting means, said mounting means being secured to said support means, said mounting means comprising:

a. a mounting plate, said mounting plate being of such a shape that it can encircle said support means, said mounting plate having at least one split therethrough, said split being of a size sufficient to permit said mounting plate to be opened at said split and placed about said support means, said mounting plate having a projection on either side of said split, said projections extending outwardly and approximately perpendicularly from said mounting plate, said mounting plate being opened at said split and placed about said support means; and

b. means for attaching said projections to one another so that said mounting plate can be secured about said support means;

C. actuating means, said actuating means comprising:

a. pivot means, said pivot means being secured to said mounting means and comprising a shaft, said shaft being rotatably mounted on said mounting plate;

b. shield means, said shield means comprising two arms, said shaft passing through one end of each of said arms, said arms being capable of rotation about said shaft, said arms terminating at their other ends in a shield, said arms and said shield being of such dimensions and being positioned relative to each other so that said shield at least partially covers the end of said filler valve which is adapted for connection to said loading hose when said arms rotate about said shaft in one direction;

c. motion imparting means, said motion imparting means comprising a cam, said cam being located adjacent to one of said arms and being eccentrically secured thereto, said cam being caused to turn with said arm to which it is secured by the rotation about said shaft of said arms; and

d. circuit breaking means, said circuit breaking means comprising a spring pressed guide, an explosion proof switch, and sealing means, one of the ends of said spring pressed guide being flat and supporting a pin, the other end of said spring pressed guide being curved, the curved end of said spring pressed guide being positioned adjacent to the edge of said cam, said explosion proof switch being water and air impervious and comprising a housing within which a portion of said ignition circuit passes, said housing having a tube extending therefrom which receives therein said pin, said pin first passing through a compression spring, said pin being capable of sliding into contact with and breaking said ignition circuit when said edge of said cam is caused to turn and bring sufficient pressure against said spring pressed guide, said pin being capable of retraction out of contact with and thereby restoring closure of said ignition circuit when said cam is caused to turn in the opposite direction, said sealing means being located at said tube and being water and air impervious while permitting the free movement of said pin in said tube, said compression spring having a diameter large enough to prevent its entrance into said tube beyond said sealing means, said compression spring bearing against said flat end of said spring pressed guide and against a portion of said tube on the side of said sealing means closer to said cam; and

D. free rotation inhibiting means, said free rotation inhibiting means comprising a stop, said stop being located on said mounting plate adjacent to one of said arms, said stop functioning to prevent a complete rotation of said arms when said arms are moved in a direction to permit clear access to said end of said filler valve;

whereby movement of said shield in a direction which permits clear access to said end of said filler valve causes said ignition circuit to be broken and functions to prevent driving of said truck while said loading hose is connected to said end of said filler valve, and whereby movement of said shield in the opposite direction to where said shield at least partially covers said end of said filler valve causes the restoration of said ignition circuit and functions to permit driving of said truck after said loading hose has safely been disconnected from said end of said filler valve.

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**4,024,898**

## ANGULAR GUIDE FOR MANUAL ROUTING MILLING MACHINES

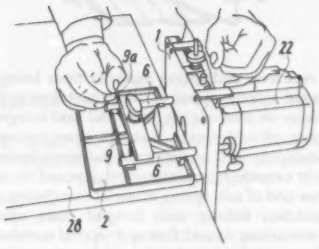
**Otto Bergler, and Eugen Lutz, both of Muhlacker-Lomersheim, Germany, assignors to Eugene Lutz KG Maschinenfabrik Lomersheim, Muehlacker, Germany**

**Filed May 7, 1975, Ser. No. 575,269**

**Claims priority, application Germany, May 7, 1974, 2421954**

**Int. Cl.² B27C** *5/10, 9/02*

**U.S. Cl. 144—134 D** **24 Claims**




18. Angular guide for hand routing millers, comprising two legs forming an angle with each other, one of these legs being fashioned as a stop plate with a smooth guiding surface, and the other of these legs being constructed as a mounting plate with holding members arranged on its outside for the routing miller, both of these legs being provided, in the zone of the apex of the angle, with apertures to pass the milling tool therethrough, wherein the leg fashioned as the mounting plate is extended beyond the apex and is likewise formed as a guiding surface at least on the side facing the smooth guiding surface of the stop plate, wherein bolts are provided for mounting the stop plate, these bolts being arranged on one side of the mounting plate, the stop plate being clamped therto, and wherein the stop plate is equipped with a manually engageable handle, and wherein the stop plate is equipped with a manually engageable handle, and wherein at least one primatic guide for one of the bolts and a clamping bracket for mounting to the bolt is provided at the side of the stop plate equipped with the handle.

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**4,024,899**

## LOCK NUT AND BOLT CONSTRUCTION

**Mary L. W. Stewart, 87 Townsend St., Fitchburg, Mass. 01420**

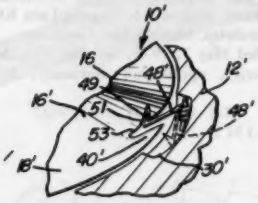
**Filed Mar. 9, 1976, Ser. No. 665,339**

**Int. Cl.² F16B** *39/30*

**U.S. Cl. 151—14 R** **9 Claims**

1. In combination, a first member having a threaded bore therein, a second member including a threaded shank portion threadedly engaged in said bore, the threads on each of said members including alternate spiral crest and root portions, the crest portions on at least one of said members including elongated integral tines spaced and facing in one direction therealong, said tines including root end portions formed integrally with the corresponding crest portions and free end portions overlying and spaced slightly outwardly of adjacent crest portions defining notches inwardly of said free end portions opening outwardly between said free end portions and said adjacent crest portions, said free end portions of said tines being at least slightly resilient and tapering in cross-sectional

area toward their free ends, at least the root portions of the other member including elongated dished recesses formed therein at points spaced therealong, said dished recesses opening outwardly of the root portions of said other member, said tines being registrable with and at least partially receivable in said recesses, some of said dishes recesses including spring material tines mounted from said other member and in said some recesses for shifting between the retracted positions at least substantially fully retracted in the corresponding recesses and extended positions projecting outwardly of the corresponding recesses, said spring material tines being yieldingly biased toward said extended positions and engageable by said crest portions on said one member and said integral tines for displacement of said spring material tines toward their retracted positions, said spring material tines being shiftable toward their extended positions when opposed by said notches and the free end of said spring material tines being engageable in said notches behind said integral tines upon relative threaded movement of said first and second members to angularly displace said one member in said one direction relative to the other member.

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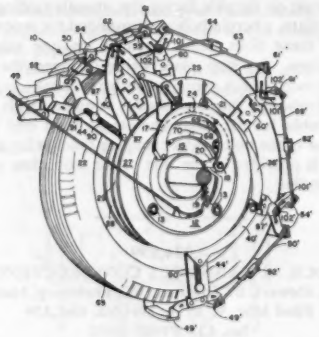
**4,024,900**

## APPARATUS FOR SELECTIVELY PROVIDING VEHICLE TRACTION

**Marvin C. Thomas, Pinewood Springs, Lyons, Colo. 80504**

**Filed July 17, 1975, Ser. No. 596,322**
**Int. Cl.² B60C *27/20***
**U.S. Cl. 152—214** **19 Claims**



**1.** A traction device comprising:

a mounting means, an outer support assembly journaled around an axis and rotatably carried on the mounting means, a plurality of radially deformable support members extending from the outer support assembly and movably secured at one end to the outer support assembly in slots defined in the outer support assembly and said slots being eccentric to the axis, at least one traction bar mounted at each end portion of the support members remote from the end thereof secured to the outer support, linkage means interconnecting the support members, and control means to selectively expand the linkage means and attached support members into a circular configuration and, alternatively, to retract the linkage means and position the attached support members in a closely spaced, stored configuration as a function of the positioning of the control means, whereby, the traction device, when mounted by attachment of the mounting means adjacent a vehicle wheel, is capable of extending the traction bars into engagement with vehicle wheel to provide traction or, alternatively, contract the linkage and retract the traction bars from the wheel into a stored position by selective positioning of the control means.

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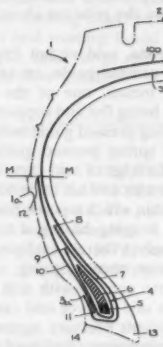
**4,024,901**

## LOWER SIDEWALL REINFORCEMENT FOR PNEUMATIC TIRES

**Dionysius Josef Poqué, Aachen, Germany, assignor to Uniroyal A.G., Aachen, Germany**

**Filed Sept. 8, 1975, Ser. No. 611,389**
**Claims priority, application Germany, Sept. 26, 1974, 7432386[U]**
**Int. Cl.² B60C *9/02*, *15/06***
**U.S. Cl. 152—354** **19 Claims**



**1.** A pneumatic vehicle tire comprising:

first and second bead units;

at least one radially extending carcass ply, the respective end portions of said carcass ply being turned up to the axially outward sides of said bead units and extending radially outward to a point radially inward of the radially outwardmost portion of the corresponding bead unit, and the respective major portions of said carcass ply being positioned axially inwardly of said bead units; and

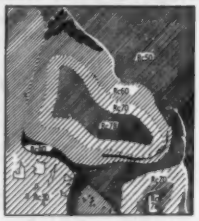
a radially extending square-woven fabric reinforcing means positioned between each of said bead units and said carcass ply, each of said reinforcing means extending throughout a major portion of the respective lower sidewall of said tire, wherein the radially inwardmost portion of each of said respective reinforcing means extends to its corresponding bead unit and is positioned axially outwardly of said bead unit and axially inwardly of the respective turned up end portion of said carcass ply, and wherein the radially outwardmost portion of each of said reinforcing means is in direct contact with, and adheres to, said carcass ply.

4,024,902

## METHOD OF FORMING METAL TUNGSTEN CARBIDE COMPOSITES

Charles S. Baum, 34108 E. Jefferson, St. Clair Shores, Mich. 48082

Continuation-in-part of Ser. No. 578,122, May 16, 1975, abandoned. This application Mar. 18, 1976, Ser. No. 668,265
Int. Cl.² B22D *19/02*
U.S. Cl. 164—97 11 Claims



7. The method of forming a composite material, comprising: supporting a plurality of first particles of tungsten carbide having a cobalt binder, of size greater than 4 mesh, and of a larger size than the particles desired in the final composite in a mold; maintaining the temperature of the mold and the particles at less than about 2200° F; heating a metal having at least 70% iron, nickel or cobalt content to at least 200° F above its melting temperature, and above about 2650° F, separately from the mold; pouring the molten metal into the mold; and immediately allowing the casting thus formed to naturally cool to produce a composite having reduced size sintered tungsten carbide particles therein surrounded by zones of high, tungsten, carbon and cobalt content metal alloy.

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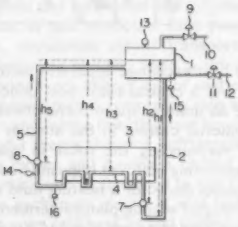
4,024,903

## EVAPORATIVE COOLING METHOD BY NATURAL CIRCULATION OF COOLING WATER

Takeo Yamada; Kazuo Kunioka; Shunichi Sugiyama, and Toyokazu Teramoto, all of Yokohama, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 573,563, May 1, 1975, abandoned. This application Mar. 29, 1976, Ser. No. 671,396
Claims priority, application Japan, May 20, 1974, 49-55379; Sept. 27, 1974, 49-110460
Int. Cl.² F28D *15/00*
U.S. Cl. 165—1 8 Claims



1. Evaporative cooling method by natural circulation of cooling water comprising the steps of using an evaporative cooling device comprising a cooling pipe fitted to an object to be cooled and a steam separator drum arranged above said cooling pipe, said cooling pipe and said steam separator drum being connected together by a downcomer and a riser, separating steam generated within the circuit of said evaporative cooling device from cooling water by means of said steam separator drum, discharging said steam to outside the circuit, totally replenishing cooling water from outside the circuit to the middle of said downcomer in an amount corresponding to the quantity of the discharged steam, keeping the cooling water in said cooling pipe in complete liquid state and causing part of cooling water to evaporate only in said riser and in said stream separator drum by setting parameters to satisfy the following formula:

$$Q/V \cdot \rho \cdot c < \Delta T_{eq}\,(P_s, Ph_3)$$

Where,

$Q$:Thermal load acting on said cooling pipe
$V$:Amount of circulated cooling water in said cooling pipe
$\rho$:Density of cooling water
$c$:Specific heat of cooling water
$P_s$:Pressure in said steam separator drum
$Ph_3$:Pressure of cooling water in uppermost part of said cooling pipe
$\Delta T_{eq}$ $(P_s, Ph_3)$:Boiling equilibrium temperature difference between $P_s$ and $Ph_3$.

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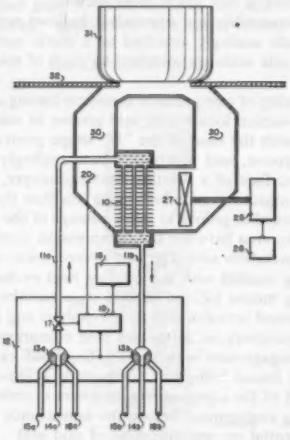
4,024,904

## FORCED AIR RANGE WITH THERMAL EXCHANGE FLUID

Stephen E. Skala, 3839 S. Wenonah Ave., Berwyn, Ill. 60402

Filed May 13, 1975, Ser. No. 577,109
Int. Cl.² F25B *13/00*
U.S. Cl. 165—2 3 Claims



1. In a method for transferring heat to food in a houseware unit in a domestic appliance from hot and cold thermal reservoirs in a heat exchange relation with thermal exchange fluid which moves in connecting lines between said thermal reservoirs and a heat exchanger in said domestic appliance, said domestic appliance having means for circulating and regulating flow of said thermal exchange fluid between one of the thermal reservoirs and said heat exchanger to control temperature within said domestic appliance, including the steps of

communicating a portion of said houseware unit within a duct of said domestic appliance,

regulating flow of said thermal exchange fluid through said heat exchanger positioned within the duct to control temperature within said duct, and

circulating air through said heat exchanger and across said portion of said houseware unit within the duct to exchange heat between the heat exchanger and the houseware unit.

4,024,905

## SEALING DEVICE FOR A ROTARY HEAT EXCHANGER, IN PARTICULAR FOR A GAS TURBINE

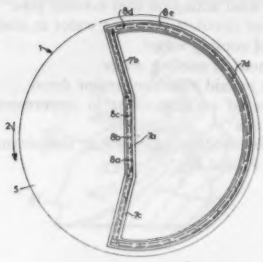
Jack Guillot, Juvisy sur Orge, France, assignor to Bennes Marrel, Andreziux Boutheon, France

Filed Oct. 15, 1973, Ser. No. 406,418

Claims priority, application France, Oct. 19, 1972, 72.38112

Int. Cl.² F28D *19/00*

U.S. Cl. 165—9 4 Claims



1. A sealing device for use in a gas turbine between a static surface and the axial surfaces of a rotating heat exchanger having a high pressure area on one side of the seal and a lower pressure area on the other side of the seal, comprising:

a. a plurality of shoe members located completely about the periphery of the area to be sealed, said shoe members having a longitudinal groove in one side thereof such that they have a "U" shape cross section,

b. a compressible and expansible bellows member having one side sealingly attached to a static surface and the other side sealingly attached to each of said shoe members,

c. a plurality of compression members having a "U" shaped cross section location in said groove in said shoe members, with the base of the "U" shape protruding beyond said groove, said protruding base sealingly engaging an axial surface of a rotating heat exchanger, the width of the compression members being less than the width of the shoe member groove to allow passage of the high pressure into the area between the compression members and the shoe members and urge said compression members into sealing contact with the rotating heat exchanger, and

d. spring means located in said shoe member groove and interposed between said shoe members and said compression members so as to bias said compression members into engagement with the rotating heat exchanger, said spring means being just adequate to compensate for the weight of the compression members in order to ensure a sealing engagement before the appearance of a pressure differential on opposite sides of said seal.

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4,024,906

## ROTARY REGENERATIVE HEAT EXCHANGER

Hugh Christopher Bramley, Coventry, England, assignor to Caterpillar Tractor Co., Peoria, Ill.

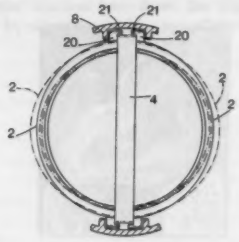
Filed Dec. 16, 1974, Ser. No. 533,447

Claims priority, application United Kingdom, Dec. 14, 1973, 58174/73

Int. Cl.² F28D *19/00*

U.S. Cl. 165—9 7 Claims

1. A rotary regenerative heat exchanger including a rotatable disc-like matrix having heat-exchange passages extending between the end faces thereof, the heat exchanger having at at least one end thereof a seal comprising an arcuate portion substantially co-axial with the matrix and a transverse portion extending chord-wise, including diametrically, of the arcuate portion, the seal portions being located in a housing containing the matrix and each comprising a pressure plate engaging the adjacent end face of the matrix and an axially- compressible resilient member acting between the housing and the pressure plate and defining a space internally of the seal portion and communicating with that of the other seal portion and with a gallery defined by the housing and arranged to receive a pressurised fluid, lugs on the pressure plate of the arcuate portion spaced apart chord-wise, including diametrically thereof, said lugs each co-operating with a respective end of the pressure plate of the transverse portion, said chord-wise



space between said lugs being less than said chord-wise length of the pressure plate of the transverse portion, whereby the pressure plate of the transverse portion is compressively stressed between the lugs on the pressure plate of the arcuate portion under cold conditions and said chord-wise length of the pressure plate of the transverse portion is such that the pressure plates of the arcuate and transverse portions are substantially stress-free under hot working conditions.

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4,024,907

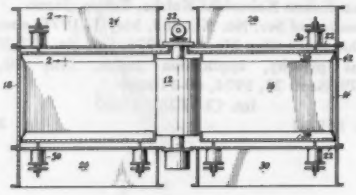
## SEALING PLATE SUPPORT

Tadek Brzytwa, Wellsville, N.Y., assignor to The Air Preheater Company, Inc., Wellsville, N.Y.

Filed Jan. 8, 1976, Ser. No. 647,523

Int. Cl.² F28D *19/04*

U.S. Cl. 165—9 6 Claims



1. Regenerative heat exchange apparatus including a cylindrical rotor shell and a central rotor post concentrically arranged to provide an annular space therebetween, a mass of heat absorbent material carried in the annular space of the rotor, a housing surrounding the rotor in spaced relation including fixed connecting plates at opposite ends of the rotor having inlet and outlet ducts for a heating fluid and a fluid to be heated, sector-shaped sealing plates intermediate the rotor and adjacent connecting plate adpapted to preclude by-passing the rotor by said fluids, plate adjusting means connecting the sealing plates to the housing structure for movement axially between a connecting plate and the rotor including an aperture extending through said connecting plate, a rigid cylindrical housing affixed to the outboard side of the connecting plate around the periphery of said aperture, a threaded actuating rod attached to said sealing plate and extending through the cylindrical housing, and an adjusting nut threaded to said actuating rod and adapted to bridge the annular space lying intermediate the actuating rod and the

cylindrical housing to move the actuating rod and the sealing plate connected thereto axially into an axial relationship that precludes fluid flow between the end of the rotor and said sealing plate when the adjusting nut is rotated about the threaded actuating rod.

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**4,024,908**

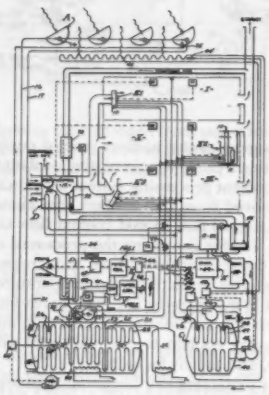
## SOLAR POWERED HEAT RECLAMATION AIR CONDITIONING SYSTEM

**Milton Meckler, 16348 Tupper St., Sepulveda, Calif. 91343**

**Filed Jan. 29, 1976, Ser. No. 653,345**

**Int. Cl.[2] F24D** *11/00*

**U.S. Cl. 165—18** **30 Claims**



**1.** A solar insolation powered air conditioning system wherein heated and chilled fluid is stored for subsequent use in heat exchanger means to temper building zone air, and including; heat concentrating collector means for the absorption of solar heat into a high temperature heat transfer fluid, a stratified thermal mass having high to moderate heat range heat storage sections, pump means circulating said heat transfer fluid through said collector means and through a heat exchange means into the high heat range section of said mass and from the low heat range section thereof returning said high temperature heat transfer fluid to said collector means, a working fluid subjected to high temperature in said high heat range section by heat transfer means in the thermal mass and pressurized into its vapor phase thereby, a heat transfer means for a heating fluid and located in and subjected to the moderate temperature in said moderate heat range section of the thermal mass, circulation means transporting said heating fluid to and from said building zone, a prime mover with an expander deriving work energy out of said pressurized working fluid, condensor means converting said working fluid into its liquid phase and means injecting said liquid phase fluid into said heat transfer means therefor, refrigeration means driven by said prime mover and having a chilled fluid circulation means transporting said chilled fluid to and from said building zone, and heat exchanger means at said building zone alternately drawing upon said heating and chilled fluids as required by thermostat control means therefor to temper the air.

**10.** A solar insolation powered humidity controlled air conditioning system wherein heated and chilled fluid is stored for subsequent use in heat exchanger means to temper building zone air, and including; a dehumidifier means havng a contactor section subjecting primary induction air to a hygroscopic solution with temperature control means therefor and having a regenerator section with heat dissipating means for heating said solution, circulation means delivering said primary induction air to said building zone, heat concentrating collector means for the absorption of solar heat into a high temperature heat transfer fluid, a stratified thermal mass having high to moderate heat range heat storage sections, pump means circulating said heat transfer fluid through said collector means and through a heat exchange means into the high heat range section of said mass and from the low heat range section thereof returning said high temperature heat transfer fluid to said collector means, a working fluid subjected to high temperature in said high heat range section by heat transfer means in the thermal mass and pressurized into its vapor phase thereby, a heat transfer means for a heating fluid and located in and subjected to the moderate temperature in said moderate heat range section of the thermal mass, circulation means transporting said heating fluid to and from said building zone, a prime mover with an expander deriving work energy out of said pressurized working fluid, said heat dissipating means of the dehumidifier comprising a condensor means converting said working fluid into its liquid phase and means injecting said liquid phase fluid into said heat transfer means therefor, refrigeration means driven by said prime mover and having a chilled fluid circulation means transporting said chilled fluid to and from said building zone, and heat exchanger means at said building zone alternately drawing upon said heating and chilled fluids as required by thermostat control means therefor to temper the air.

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**4,024,909**

## TEMPERATURE RESPONSIVE MULTI-FUNCTION VALVE

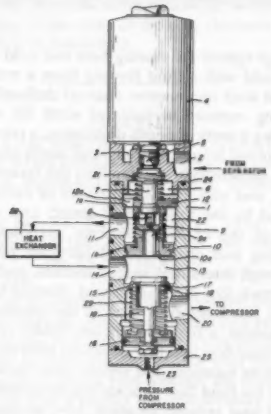
**Rudolf Hofmann, Jr., Diedenbergen, Germany, assignor to Sullair Corporation, Michigan City, Ind.**

**Filed June 2, 1975, Ser. No. 583,033**

**Claims priority, application Germany, June 6, 1974, 7419504[U]**

**Int. Cl.[2] G05D** *23/02*

**U.S. Cl. 165—35** **9 Claims**




**1.** A valve for compressor cooling liquid, comprising:

a housing having an inlet for connection with the cooling liquid separator, an outlet for connection with a compressor, and a flow passage therethrough between the inlet and outlet;

a pair of valve seats disposed in said housing along the flow passage between the inlet and outlet;

a first port between the inlet and one valve seat for connection with the intake port of a cooling liquid heat exchanger;

a second port between said one valve seat and the outlet for connection with the discharge port of the cooling liquid heat exchanger;

a first valve member adapted to cooperate with said one

valve seat and seal the flow passage, said first valve member being actuated by a thermal operator responsive to the cooling liquid temperature to regulate the ratio of direct flow of cooling liquid through the flow passage to the indirect flow of cooling liquid through the heat exchanger, said first valve member opening the flow passage when the cooling liquid is cool and closing the flow passage when the cooling liquid is hot; and

a second valve member adapted to cooperate with the other valve seat and seal the flow passage, said second valve member being responsive to the operation of the compressor to open the flow passage when the compressor is operating and to close the flow passage when the compressor is not operating to control the flow of cooling liquid through the valve and the heat exchanger.

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**4,024,910**

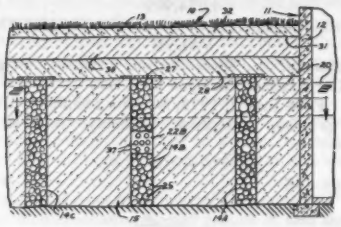
## ROCK CHANNEL HEAT STORAGE

**Frank D. Werner, Box SR9, Jackson, Wyo. 83001**

**Filed May 21, 1975, Ser. No. 579,492**

**Int. Cl.² F28D** *21/00*

**U.S. Cl. 165—45** **11 Claims**



1. A storage system for storing heat and cold and exchanging heat or cold with a fluid flowing from a remote location comprising at least one narrow channel defined between two spaced, facing exposed surfaces of earth fill material, said channel having a vertical depth dimension, a transverse width, and a longitudinal length, said vertical depth and longitudinal length being substantially greater than the transverse width of the channel, and said exposed surfaces of earth fill material being defined by the longitudinal length and vertical depth dimensions of the channel, discrete particles of rock-like material filling said channel, said particles permitting fluid passage through interstitial spaces thereof, and said discrete particles of rock-like material in said channel being in direct heat transfer relationship to both of the exposed surfaces of earth fill material, a first duct means fluidly connecting said channel for fluid flow in a first direction between said channel and said remote location, and second duct means connecting said channel for fluid flow in a second direction between said channel and said remote location, said second duct means being spaced from said first duct means and physically separated from the first duct means and communicating with said first duct means only through said discrete particles to permit exchange of heat from a fluid circulated from said first duct means to said second duct means and through said discrete particles initially with said discrete particles as the fluid is flowing and without circulating other fluids through said discrete particles, whereby a fluid such as air that is circulated through said first duct means and returned through said second duct means must pass through interstitial spaces between said discrete particles filling said channel, said exposed surface of earth fill defining said channel being of substantial size to permit heat transfer between the earth fill material adjacent said exposed surfaces and the discrete particles filling the channel over a desired period of time.

**4,024,911**

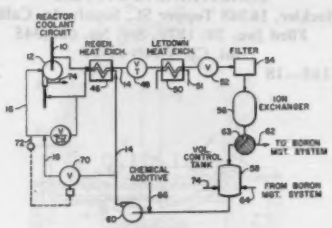
## PUMP SHAFT SEAL INJECTION SYSTEM

**Alan Wayne Forrest, East Hampton, Conn., and James Paul Pelletier, Hatfield, Mass., assignors to Combustion Engineering, Inc., Windsor, Conn.**

**Filed Mar. 18, 1974, Ser. No. 452,092**

**Int. Cl.² G21C** *19/20*

**U.S. Cl. 165—107** **4 Claims**




1. In a pressurized water nuclear reactor coolant flow circuit incorporating a pump for circulating coolant through said circuit and a coolant processing system for processing a flow of coolant removed from said coolant flow circuit and readmitting the processed flow to said coolant flow circuit including a charging line for conveying the processed coolant to be readmitted to the coolant flow circuit and a regenerative heat exchanger operative to increase the temperature of the processed coolant in the charging line prior to readmission to said coolant flow circuit, the invention comprising means for supplying high purity coolant to the shaft seal system of said coolant pump, said means including:

a. means for extracting low temperature processed coolant from said charging line upstream of said regenerative heat exchanger;

b. means for extracting high temperature processed coolant from said charging line downstream of said regenerative heat exchanger;

c. means for mixing said low temperature coolant with said high temperature coolant; and

d. means for injecting the resultant mixture into said coolant pump shaft seal system.

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**4,024,912**

## HYDROGEN GENERATING SYSTEM

**Joseph T. Hamrick, 6364 Jae Valley Road SE., Roanoke, Va. 24014, and Leslie C. Rose, Box 68, Rocky Mount, Va. 24251**

**Continuation-in-part of Ser. No. 611,138, Sept. 8, 1975, Pat. No. 3,982,592, which is a continuation-in-part of Ser. No. 534,778, Dec. 20, 1974, abandoned. This application Jan. 29, 1976, Ser. No. 653,360**

**Int. Cl.² B01J** *8/00;* **E21B** *43/24*

**U.S. Cl. 166—57** **10 Claims**

1. A system for producing hydrogen for use for recovering hydrocarbons and other fluids from an underground formation containing hydrocarbons and penetrated by an operating borehole comprising:

generating means for burning hydrocarbons with just enough oxygen to convert substantially all of the carbon of the hydrocarbons to carbon monoxide to form carbon monoxide and free hydrogen,

reforming means containing a catalyst coupled to said generating means for receiving said carbon monoxide and hydrogen,

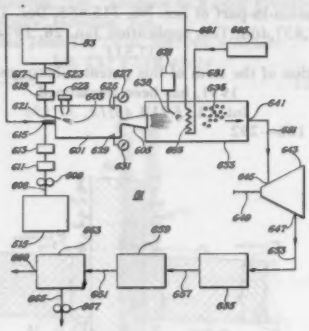
means for adding water or steam to said reforming means to produce carbon dioxide and more hydrogen,

cooling means for cooling said carbon dioxide and hydrogen produced by said reforming means,

compressing means for compressing said carbon dioxide and hydrogen from said cooling means,

removal means coupled to the output of said compressing

means for removing said carbon dioxide from the gases flowing from the output of said compressing means to obtain substantially pure hydrogen, and



means for flowing the hydrogen from said removal means to a utilization device located in said operating borehole at or near the level of said formation.

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**4,024,913**

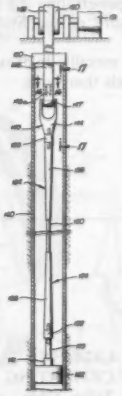
**WELL INSTALLATIONS EMPLOYING NON-METALLIC LINES, TUBING CASING AND MACHINERY**

**Donovan B. Grable, 2515 San Francisco Ave., Long Beach, Calif. 90806**

**Continuation-in-part of Ser. No. 454,069, March 25, 1974, abandoned. This application Mar. 29, 1976, Ser. No. 671,141**

**Int. Cl.² E21B** *17/00, 17/02;* **F16L** *11/02;* **F16G** *11/05*

**U.S. Cl. 166—72** **15 Claims**



1. In a well installation, the combination comprising

a. an axially elongated first line sized to extend downwardly in the well and support well equipment therein, the line have an end portion,

b. said line consisting of multiple parallel non-metallic fibers having a tensile strength greater than 185,000 psi and having a specific gravity less than 2.0,

c. an externally axially tapered and elongated metallic plug centrally penetrating said end portion, and a metallic sleeve receiving said line end portion and said plug, said sleeve having an axially tapered bore and said fibers retained between said plug and said bore, said sleeve connected to said plug, and

d. a well pump connected to said sleeve to be suspended within well casing.

**4,024,914**

**METHOD OF PROCESSING COAL CHANNELS IN UNDERGROUND COAL GASIFICATION**

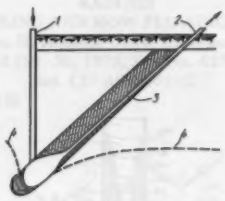
**Efim Vulfovich Kreinin, ulitsa Chugunnye Vorota, 21, korpus 3, kv. 69, Moscow, U.S.S.R.**

**Filed Nov. 10, 1975, Ser. No. 630,435**

**Claims priority, application U.S.S.R., Dec. 27, 1974, 2090251**

**Int. Cl.² E21B** *43/24*

**U.S. Cl. 166—251** **2 Claims**



1. In a method of processing coal channels in underground gasification of coals, particularly when processing bored coal channels during the period when an underground gas generator is put into operation, wherein a substantial amount of air is forced through air blow wells into the zone of coal seam gasification, and then hot gases from this zone are taken away through the coal channels being processed and gas discharging wells, the improvement which comprises determining the magnitude of the hydrostatic pressure by measuring the hydrostatic column of underground waters in a vertical direction from the point at which air is forced into said well to the level of said underground waters, adjusting the outlet section of gas discharging wells to maintain a pressure in the coal channels being processed at a level not less than that of said hydrostataic column of underground waters, and raising the temperature in the coal channels being processed to above 500° C, whereby swelling of the walls of the coal channels or clogging the coal channels is minimized.

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**4,024,915**

**RECOVERY OF VISCOUS OIL BY UNHEATED AIR INJECTION, FOLLOWED BY IN SITU COMBUSTION**

**Joseph C. Allen, Bellaire, Tex., assignor to Texaco Inc., New York, N.Y.**

**Continuation of Ser. No. 493,286, July 31, 1974, abandoned. This application Jan. 15, 1976, Ser. No. 649,294**

**Int. Cl.² E21B** *43/24*

**U.S. Cl. 166—256** **10 Claims**

1. A method of recovering viscous petroleum from subterranean, viscous petroleum containing formations penetrated by at least one injection well and by at least one production well, both wells being in fluid communication with the petroleum containing formation, of the type wherein the formation adjacent the injection well is heated to a temperature sufficient to cause a combustive reaction to occur, and thereafter a first oxygen containing gas is injected into the formation via the injection well for the purpose of propogating a combustive reaction zone through the formation to stimulate recovery of petroleum from the formation via the production well, wherein the improvement comprises:

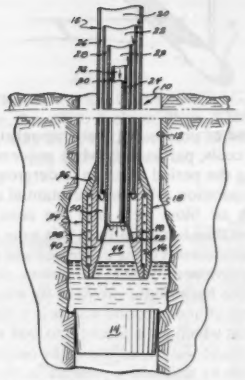
introducing a second, unheated oxygen-containing gas at a temperature of 150° F or less, into the formation, via the injection well, and allowing the unheated oxygen-containing gas to remain in contact with the formation petroleum for a period of time of at least 20 days prior to the steps of heating the formation and injecting the first oxygen containing gas into the formation, to cause a low temperature oxidative reaction to occur in the formation, thereby preconditioning the viscous petroleum.

4,024,916

## BOREHOLE SEALING METHOD AND APPARATUS

James N. Hartley, Richland, and George Jansen, Jr., Kennewick, both of Wash., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Aug. 5, 1976, Ser. No. 711,904
Int. Cl.² E21B 33/10, 33/13
U.S. Cl. 166—288 5 Claims



1. A method for permanently sealing a borehole in the earth comprising:
mechanically blocking the borehole at sealing level;
positioning a sealing apparatus capable of melting rock and earth in the borehole just above seal level;
heating the sealing apparatus to rock and earthmelting temperature;
supplying sufficient rock to the sealing apparatus which, when melted, forms a pool of molten material on the mechanical block filling the bottom of the borehole and cooling the molten material to below melting temperature whereby it solidifies, thereby sealing the borehole.

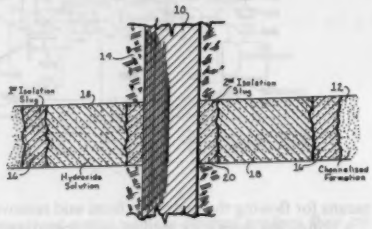
3. A high-temperature apparatus for sealing boreholes with molten rock and earth comprising:
a. an elongated tubular body having a lower end;
b. a relatively short tubular melter extending downward from the lower end of the body defining an inner melting chamber, said melter having a tubular shaped electrically powered heater capable of providing sufficient heat to melt rock and earth, an outer melter around the outer surface of the heater for transferring heat to and melting the walls of the borehole and an inner melter around the inner surface of the heater for transferring heat to and melting rock and earth in the inner melting chamber;
c. means for supplying electrical power to the heater;
d. means for cooling the apparatus, including means for supplying coolant to the apparatus;
e. means for positioning the apparatus in a borehole; and
f. means for supplying air entrained powdered rock and earth to the inner melting chamber.

4,024,917

## CALCIUM AND MAGNESIUM HYDROXIDE PLUGGING PROCESS

Waylan C. Martin, P.O. Box 1468, Monahans, Tex. 79756

Continuation-in-part of Ser. No. 315,655, Dec. 15, 1972, Pat. No. 3,837,400. This application Jan. 28, 1974, Ser. No. 437,511
The portion of the term of this patent subsequent to Sept. 24, 1991, has been disclaimed.
Int. Cl.² E21B 43/12, 33/138
U.S. Cl. 166—292 6 Claims




1. In an oil bearing zone which has channelized
a. said zone containing connate water with
b. metallic ions which will form a low soluble precipitate therein;
c. the method of plugging water channels therein comprising the steps of:
d. injecting an isolation slug of water low in magnesium and calcium, then
e. injecting an aqueous solution of hydroxide therein, thereby
f. isolating said hydroxide solution from the connate water near the point of injection and thereafter,
g. breaking down and penetrating the isolation slug, thus
h. permitting the mixture of the hydroxide solution and connate water, thus
j. forming an insoluble metallic hydroxide, thereby
k. plugging said channels therewith.

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4,024,918

## METHOD OF CEMENTING A WELL

Oliver W. Crinkelmeyer, Tulsa, Okla., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 558,569, March 14, 1975, Pat. No. 3,998,773. This application June 23, 1975, Ser. No. 589,324
Int. Cl.² E21B 33/138, 33/14
U.S. Cl. 166—293 5 Claims

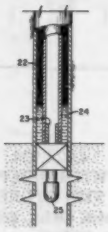
1. A method of cementing in a borehole penetrating a subterranean foundation which comprises:
emplacing in an area within said borehole to be cemented a hydraulic cement slurry which comprises, a hydraulic cement and based on 100 parts by weight of said cement; water, from about 35 to about 65 parts; from about 0.6 to about 2 parts of polyethylene oxide having a molecular weight of at least about 300,000 and from about 0.5 to about 2.5 parts of an alkali metal salt of the condensation product of mononaphthalene sulfonic acid and formaldehyde.

4,024,919

## TECHNIQUE FOR INSULATING A WELLBORE WITH SILICATE FOAM

Luis Pujol, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed June 16, 1976, Ser. No. 696,604
Int. Cl.² E21B *43/24*
U.S. Cl. 166—303 12 Claims



1. A process for thermally insulating a tubing string suspended within a wellbore which comprises:

injecting into the wellbore-tubing string annular space an aqueous solution containing water-soluble silicate,

injecting into the wellbore-tubing string annular space a fluid substantially free of silicate to buffer a portion of the tubing from the silicate solution,

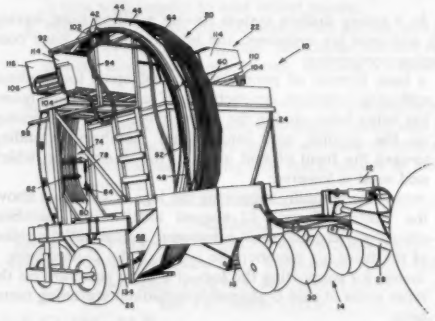
introducing thermal energy into the tubing string to remove water from the silicate solution and to deposit a coating of silicate on the tubing.

4,024,920

## ROOT CROP HARVESTER

Virgil Dean Haverdink, Ankeny, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Oct. 24, 1975, Ser. No. 625,736
Int. Cl.² A01D *17/00*
U.S. Cl. 171—58 17 Claims



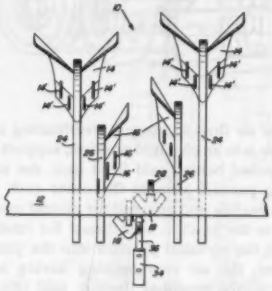
1. A root crop harvester comprising: a mobile frame, root digging means secured across the forward end of the frame; first conveyor means disposed rearwardly of the digging means and inclined upwardly and rearwardly therefrom for receiving roots from the digging means and conveying the roots upwardly and rearwardly; annular elevator means supported on the frame for rotation about a horizontal axis, the interior lower portion thereof defining a root-receiving area; second conveyor means disposed rearwardly of the first conveyor means and transverse thereto for receiving roots from the first conveyor means and for moving the same transversely to the root-receiving area; means transversely spaced from the root-receiving area for supporting the second conveyor means at its discharge end; means for diverting roots from the second conveyor means onto the root-receiving area; a root storage tank carried by the frame above said second conveyor means and adjacent said annular elevator means and having means therein for discharging the stored roots onto the second conveyor means; and a reversible conveyor means supported on the frame and disposed in underlying and root-receiving relationship to the annular elevator means for receiving roots therefrom and moving the same transversely to either an outer deposit area or the root storage tank.

4,024,921

## FIELD BREAKING AND ROW PLOWING IMPLEMENT

Robert C. Tibbs, II, Hospital Drive, Cleveland, Miss. 38732

Filed Oct. 30, 1975, Ser. No. 627,244
Int. Cl.² A01B *49/02*
U.S. Cl. 172—146 2 Claims



1. A combination implement for plowing and breaking up soil in a single pass comprising a frame structure for attachment to a tractor, means attached to said frame structure for performing a plurality of cutting and turning operations in a single pass of the tractor mounted implement which includes the following elements, a deep cutting subsoiler, a first single sweep behind the deep cutting subsoiler and slightly offset outwardly to one side thereof, a second single sweep behind the deep cutting subsoiler and slightly offset outwardly therefrom to the side opposite the side of the first sweep and also slightly behind the first sweep, one single moldboard plow behind both single sweeps and slightly offset to one side outwardly of the first single sweep, another single moldboard plow behind both single sweeps and offset to one side outwardly of the second single sweep as well as being slightly behind the one single moldboard plow, one double moldboard plow behind both single moldboard plows and slightly offset outwardly from the one single moldboard plow, and another double moldboard plow behind both single moldboard plows and slightly offset outwardly from the other single moldboard plow so that a total of 10 turning and laying operations may be effected.

4,024,922

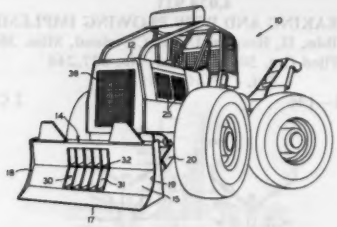
## BLADE ATTACHMENT WITH BUILT-IN AIR VENT

Richard E. Ronald, St. Thomas, Canada, assignor to Clark Equipment Company, Buchanan, Mich.

Filed June 20, 1975, Ser. No. 588,927
Int. Cl.² E02F *3/76*
U.S. Cl. 172—801 1 Claim

1. For a tractor having an engine space at the front thereof and a fan in the engine space providing a forced flow of air through the front of the engine space, a blade attachment comprising an elongated dual-position blade mountable in a first or lowered position for stacking work wherein the blade is disposed at ground level and in a second or elevated position for clearing work wherein the blade is disposed in an elevated position substantially overlying the forward end of the engine space in blocking relation to air flow through the space, the

blade comprising a front face, which has a substantially flat upper edge and a lower edge and is continuous therebetween over most of the width of said face, said front face further being continuous inwardly from the side edges thereof to generally the center thereof, said blade face having an air vent opening therethrough, which extends downwardly below the top edge of said continuous front face and is positioned in the center of the blade substantially midway between said side edges, said air vent opening being disposed substantially in the



path of engine air flow to prevent overheating of the engine when the blade is in an elevated position, support structure for the blade disposed behind said front face, the support structure including parallel arms at the outer ends of the blade extending rearwardly and adapted for pivotal mounting at the trailing ends to the tractor, and means for raising the blade attachment to the elevated position into the path of air flow for the engine, the air vent opening having a plurality of spaced vertical ribs mounted therein, said ribs joined by a horizontal web to form a grille.

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**4,024,923**

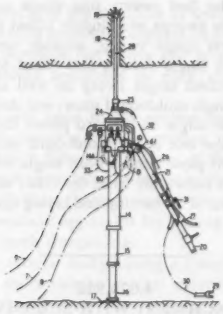
**ROCK BOLTING EQUIPMENT**

**Kenneth Joseph Broadbent, 13 Barford St., Speers Point, New South Wales 2284, Australia**

**Continuation-in-part of Ser. No. 307,228, Nov. 16, 1972. This application Jan. 21, 1976, Ser. No. 651,146**

**Int. Cl.² E21C *1/10***

**U.S. Cl. 173—57** **9 Claims**



9. Drilling equipment for drilling holes in mine roofs for the purpose of rock bolting, said equipment comprising an intermediate portion, an extendible leg mounted on and extending from one end of said intermediate portion, drill rod holding means mounted on and extending from another end of said intermediate portion, said another end of said intermediate portion being remote from said one end thereof, a rotary hydraulic motor mounted on said intermediate portion and coupled to said drill rod holding means, a longitudinal axis of said leg being substantially coaxial with the axis of rotation of said drill rod holding means, valve means for supplying pressure fluid to said motor and said leg, said valve means being mounted on said intermediate portion, an elongated torque and control arm pivotally connected at one end thereof to said intermediate portion for pivotal movement in the plane of the axis of rotation of said drill rod holding means, manual actuator means at another end of said torque and control arm remote from said one end thereof, and transmission means coupled between said actuator means and said valve means, thereby allowing an operator to control said drilling equipment from a distane.

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**4,024,924**

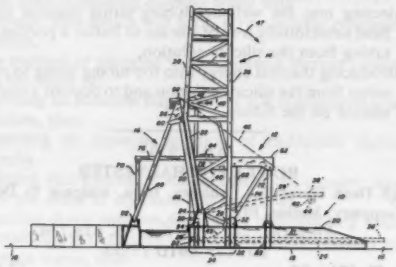
**DRILLING RIG WITH INDEPENDENT TABLE STRUCTURE**

**Theodore B. Houck, Tulsa, Okla., assignor to Parker Drilling Company, Inc., Tulsa, Okla.**

**Filed July 7, 1975, Ser. No. 593,636**

**Int. Cl.² E21B *15/00***

**U.S. Cl. 173—151** **6 Claims**



1. In a rotary drilling system having a tilting mast having front and rear leg members, the improvement in base construction comprising:

a. a base formed of paralleled, spaced apart longitudinal stiffening members, on each side of said base, each member being fabricated in the shape of a U, said base resting on the ground, said longitudinal members extending toward the front of said mast, in the direction in which said mast is lowered;

b. means for pivotally supportng the legs of said mast above the center of sand U shaped longitudinal members whereby when said mast is lowered, a substantial portion of the front leg members lie inside of the U-members;

c. means for supporting the legs of a table structure on the inner arms of said U shaped longitudinal stiffening members;

d. a front portion of said table structure supported on four legs, between the legs of, and in front of said mast;

e. a back portion of said table structure supported on four legs between the legs of, and behind said mast; and

f. a central portion of said table supported from and between said front and back portions, said central portion between and directly under said mast, and supporting a rotary table, the width of said table structure being less than the space inside of the mast legs whereby said mast can be raised and lowered without interference from said table; and

g. a frame means for lowering said mast to the front, said A frame supported on said U members behind said mast;

whereby said mast is being raised or lowered by cable over said A frame, said U members provide support for the overhanging weight of said mast.

## 4,024,925
## EQUIPMENT HANDLING APPARATUS

Joe R. Brown, P.O. Box 19236, Houston, Tex. 77024

Filed Jan. 12, 1976, Ser. No. 648,128
Int. Cl.² E21B *19/00, 15/00*
U.S. Cl. 175—85 16 Claims

1. Apparatus for manipulating equipment, for use in relation to a bore, comprising:

a. support structure means;

b. at least two pulley means;

c. track means joined to said support structure means, and which may be oriented to run generally toward and away from said bore;

d. swivel means constrained to movement along said track means;

e. elevator means supported by said swivel means and including means for selectively gripping said equipment;

f. powered tilt means for selectively pivoting said elevator means with respect to said swivel means;

g. belt means passing around said pulley means, and joined to said swivel means against substantial motion relative thereto along said track means, forming a closed loop; and

h. drive means, linked to at least one of said pulley means, for selectively moving said belt means about said pulley means to cause said swivel means and said elevator means to selectively move along said track means as said belt means moves.

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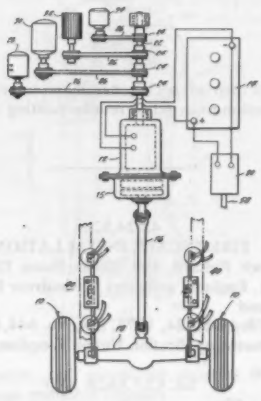
## 4,024,926
## ENERGY SYSTEM FOR SELF-PROPELLED VEHICLES

Aristotel Butoi, 689 Senica Ave., Ridgewood, N.Y. 11227

Filed Sept. 15, 1975, Ser. No. 613,187
Int. Cl.² B60K *25/10*
U.S. Cl. 180—65 D 5 Claims

1. An energy system for self propelling a vehicle having a least one wheel driven by a motor, said energy system comprising; a detecting means for responding to vibrations and bouncing of the wheel caused by irregularities in the road surface, converting means for changing the vibrations and bouncing detected into electrical energy, and driving means for driving the motor from said electrical energy, said detecting means comprising a piston and cylinder arrangement, lever means coupling the piston and cylinder arrangement to the wheel to cause the piston to reciprocate within its cylinder in response to the wheel vibrations and bouncing, said converting means compressing turbine means, pipe output means interconnecting said piston and cylinder arrangement with said turbine means and adapted to contain a fluid, the fluid being pressurized by the reciprocating motion of said piston and then passing through said pipe output means to cause said turbine means to operate, and electrical generator means coupled to said turbine means to generate electrical energy in response to the operation of said turbine means; said driving means comprising battery means for operating the motor, said battery means connected to said generator means for being charged therefrom, and said converting means further comprising first reservoir means interconnected between said pipe output means and said turbine means for storing the pressurized fluid prior to its flow into the turbine means, second reservoir means for storing the fluid flowing out of said turbine means, and input pipe means interconnecting said second reservoir means with said piston and cylinder arrangement for bring fluid into said piston and cylinder arrangement to be pressurized, whereby a closed loop fluid system is formed, and



safety valve means directly connected between said first and second reservoir means, whereby excess pressurized fluid can bypass said turbine means and flow directly from said first to said second reservoir means; said safety valve means comprising a cylinder having an input and output end, a piston capable of sliding within said cylinder, biasing spring means holding said piston adjacent said cylinder input end, said piston containing a flow passage transversely therethrough and a spring held plug closing said flow passage, said plug having an end thereof extending from said piston into said cylinder, whereby when sufficient fluid pressure is applied against said piston to overcome said biasing spring, said piston slides through said cylinder to the output end thereof causing the output end of said cylinder to push against the extending end of the plug to thereby open said flow passage.

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## 4,024,927
## LOWERING DEVICE

John B. Sheppard, 2939 Riverside Drive, Burbank, Calif. 91505

Filed Dec. 22, 1975, Ser. No. 643,008
Int. Cl.² B65H *59/10;* A62B *1/14*
U.S. Cl. 182—5 17 Claims

1. A lowering device comprising:

a flexible line adapted to be connected at one end to a support structure and to hang downwardly therefrom;

a unit carried by said line and slidable downwardly therealong; and

means for supporting a person or other load from said unit;

said unit containing and defining a circuitous passage through which said line extends in a relation introducing friction between the line and unit to slow the descent of the unit along the line;

said circuitous passage in extending through said unit being shaped to first advance generally circularly in one direc-

tion, and then advance generally circularly in the opposite direction to avoid or reduce twisting of the line.

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**4,024,928**

## FIRE ESCAPE INSTALLATION

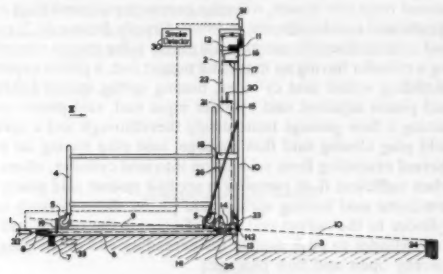
**John Frederick Pickard, and Gillian Susan Pickard, both of Beaworthy, England, assignors to Montrose Properties Limited, England**

**Filed Dec. 24, 1975, Ser. No. 644,197**

**Claims priority, application United Kingdom, Jan. 8, 1975, 726/75**

**Int. Cl.² A62B** *3/00*

**U.S. Cl. 182—19** **10 Claims**



1. A fire escape unit for installation in a building, comprising:

- fixed support structure;
- a normally vertical wall hinged at its lower end to the support structure for pivotal movement about a horizontal axis,
- a normally horizontal platform adapted to support a mobile load such as a castor-mounted bed,
- means pivotally attaching one end of the platform adjacent the wall to the fixed support structure for pivotal movement about a horizontal axis parallel to the hinge axis of the wall, and
- actuator means operable to cause the platform to adopt an inclined position in which it slopes downwardly towards the wall and to cause outward movement of the wall about its hinge axis into an outwardly projecting position in which it forms a ramp acting as a continuation of the inclined platform,

whreby the mobile load can move under the influence of gravity from the platform on to the ramp formed by the wall upon operation of the actuator means.

**4,024,929**

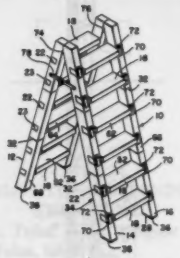
## LADDER

**Daniel Mintz, Pembroke Station, Unit A, F.C.I., Danbury, Conn. 06810**

**Filed Nov. 18, 1974, Ser. No. 524,622**

**Int. Cl.² E06C** *1/10, 7/50*

**U.S. Cl. 182—151** **7 Claims**



1. In a ladder construction, the combination of

A. a plurality of similar, interfitting, modular, rail units, each rail unit having a first end and a second end,

1. said rail units including longitudinally aligned means to interconnect longitudinally juxtaposed rail units,

a. the longitudinally aligned means comprising a strut which projects from a first end of the rail unit, said strut engaging the second end of a longitudinally juxtaposed rail unit and a socket recess in the second end of a modular rail unit, the projecting strut of one modular rail unit being insertable through the socket recess of an adjacent modular rail unit to connect longitudinally adjacent modular rail units,

2. said rail units including recessed means to receive rung units therein,

b. the recessed means being provided with tongue means to receive the said rung interconnecting means, and a plurality of rung units to connect to the rail units,

1. said rung units including interconnecting means to affix to the rail units.

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**4,024,930**

## LUBRICATING DEVICE AND METHOD

**Ronald E. Thomson, Cambridge, and Philip J. Kast, Madison, both of Wis., assignors to Madison-Kipp Corporation, Madison, Wis.**

**Filed Oct. 3, 1975, Ser. No. 619,421**

**Int. Cl.² F16N** *7/14*

**U.S. Cl. 184—15 B** **20 Claims**

1. A lubricating system for lubricating conveyor chains, said system comprising:

a shaft fixed relative to a chain to be lubricated;

said shaft having lubricating fluid inlet means and an inlet and outlet manifold means;

a sprocket adapted to rotate on said shaft and having at least a sprocket tooth for engagement with a conveyor chain to be lubricated and a lubricating fluid discharge means positioned on the sprocket;

said sprocket including lubricating fluid discharge means for ejecting lubricating fluid from said discharge means onto a chain to be lubricated;

a pump body attached to said sprocket and adapted for rotation about said shaft;

said pump body having a chamber for receiving lubricating fluid;

means associated with said pump body for evacuating lubricating fluid from said chamber;

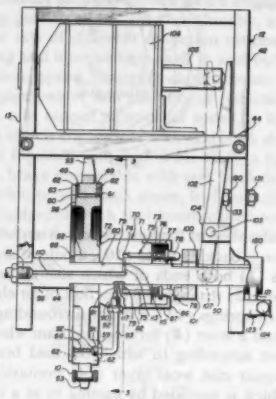
means for providing a lubricating fluid passage between said lubricating fluid inlet and outlet manifold means and said pump body chamber; and,

means for delivering lubricating fluid from said pump body to said fluid discharge means said sprocket, whereby when lubricating fluid in said chamber is evacuated, it passes from said chamber, through said shaft lubricating fluid outlet manifold and lubricating fluid delivery means to said discharge means associated with said sprocket where the lubricating fluid is ejected onto a chain to be lubricated.

**20.** The method of lubricating a conveyor system according to the steps of:

receiving lubricating fluid from a storage area;

passing said lubricating fluid through to an inlet manifold of a rotatary pump body positioned on a shaft, and said rotatary pump body having at least one chamber therein;



rotating said pump body to a first position with respect to said shaft where lubricating fluid is conveyed from said inlet manifold to said piston chamber;

rotating said pump body to a second position with respect to said shaft so that said piston chamber connects with an outlet manifold;

subsequently evacuating said lubricating fluid from said piston chamber and passing said lubricating fluid to a delivery means connecting said pump body to a sprocket having teeth adapted to contact a conveyor system to be lubricated;

passing lubricating fluid from said delivery means to a discharge means located in said sprocket; and

thereafter ejecting lubricating fluid from said discharging means onto a conveyor system to be lubricated.

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**4,024,931**

## DISK BRAKE ASSEMBLY FOR VEHICLES

**Hermann Klaue, Tour d'Ivoire 24 e, 1820 Montreux, Switzerland**

**Continuation-in-part of Ser. Nos. 582,982, June 2, 1975, abandoned, and Ser. No. 578,876, May 19, 1975, which is a continuation-in-part of Ser. No. 415,681, Nov. 14, 1973, abandoned, Ser. No. 470,303, May 15, 1974, Pat. No. 3,952,842, Ser. No. 457,261, April 2, 1974, Pat. No. 3,942,610, Ser. No. 73,566, Sept. 18, 1970, abandoned, and Ser. No. 288,287, Sept. 2, 1972, Pat. No. 3,885,650. This application Dec. 18, 1975, Ser. No. 642,160**

**Claims priority, application Germany, Jan. 23, 1975, 2502628; Jan. 20, 1975, 2502090; Jan. 20, 1975, 2502083; Aug. 25, 1973, 2343004; Switzerland, Nov. 17, 1972, 16741/72; Germany, Dec. 27, 1969, 1965170; Dec. 27, 1969, 1965171; Dec. 2, 1969, 1960286**

**Int. Cl.² F16D** *55/02*

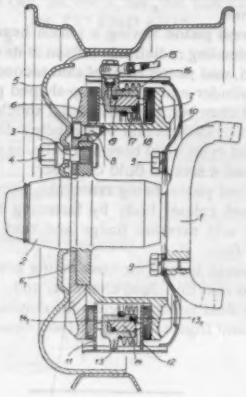
**U.S. Cl. 188—18 A** **8 Claims**

**1.** A fully lined disk brake and wheel assembly for a vehicle comprising

a wheel and means for rotatably supporting the wheel on a vehicle comprising a first annular radially extending flange member,

a brake housing having axially spaced first and second annular wall members, said wall members having inner surfaces which serve as braking surfaces, an annular channel between said inner surfaces which is open on its radially outward side,

means for attaching the said brake housing to said first annular radially extending flange member comprising a second annular flange member fastened to said wall members which extends radially inwardly from the wall members and overlaps the said first annular radially extending



flange member, and means for securing the first and second flange members together,

axially spaced brake disks disposed in the annular channel with one brake disk facing a first of said braking surfaces and the other brake disk facing the second of said braking surfaces,

means disposed in the said channel between the brake disks for moving the brake disks axially into contact with the braking surfaces, and

means for supporting the brake disks in the channel against rotation with the brake housing but free to move axially therein.

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**4,024,932**

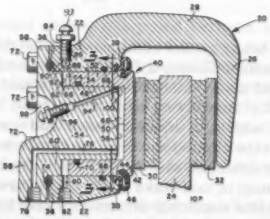
## DUAL DISPLACEMENT DISC BRAKE CALIPER ASSEMBLY

**Clarence C. Fay, 17211 Edgewater Drive, Lakewood, Ohio 44107**

**Filed June 4, 1976, Ser. No. 693,096**

**Int. Cl.² F16D** *55/224*

**U.S. Cl. 188—106 P** **7 Claims**



**1.** A disc brake caliper assembly comprising:

a. a caliper body having

1. a first leg adapted to be disposed on one side of a disc rotor, and having a flange receiving external face
2. a second leg adapted to be disposed on the opposite side of said disc rotor
3. means joining said first and second legs and adapted to span said disc rotor,

b. a cylindrical bore of constant diameter extending from side to side of said first leg and dimensioned to receive a cup-shaped piston for reciprocal movement therein;

c. said cup-shaped piston having a first piston head and an annular piston skirt, said cup-shaped piston being internally bored as cylinder closed at one end and adapted to receive a second piston for reciprocal movement between said pistons;

d. said second piston having a piston head at an external flange extending radially therefrom at its outer end and its inner end, said piston head of said second piston and said closed cylinder end of said cup-shaped piston defining a first fluid chamber, and an annular shoulder intermediate said ends of said second piston being dimensioned to fit within said cylindrical bore and defining with said annular piston skirt a second fluid chamber;

e. said second piston being removably secured to said first leg of said caliper body by fastening means extending between said external flange and said flange receiving external face;

f. fluid passage means for conducting pressurized fluid to and from said first fluid chamber, and;

g. separate fluid passage means for conducting pressurized fluid to and from said second fluid chamber.

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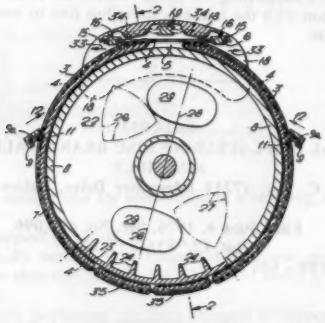
**4,024,933**

## BRAKE AND VEHICLE BRAKING SYSTEM

**Mitja Victor Hinderks, 15a Adamson Road, London, England (NW3)**

**Filed Oct. 25, 1974, Ser. No. 518,075**
**Int. Cl.² F16D *49/12, 65/06***
**U.S. Cl. 188—77 R** **15 Claims**



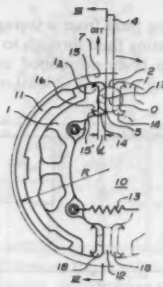
1. A band brake system comprising a rotatable brake drum having an annular flange, a flexible brake and circumferentially arranged about the annular flange of said drum, actuating means for contracting said brake band into frictional engagement with said annular flange and guide means arranged about the circumference of said brake band for urging, during contraction of said brake band about the rotating drum, a segment of said brake band radially toward said annular flange in one rotational direction of said brake drum and radially away from said annular flange in the other rotational direction of said brake drum to thereby more evenly distribute the radial frictional loads between said brake band and said annular flange.

**4,024,934**

## BRAKE SHOE

**Masahiro Shibata, Tsuzuki, Japan, assignor to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan**

**Filed Jan. 5, 1976, Ser. No. 646,499**
**Claims priority, application Japan, Jan. 8, 1975, 50-5711[U]**
**Int. Cl.² F16D *65/08***
**U.S. Cl. 188—250 G** **1 Claim**



1. In a brake shoe of a brake having an anchor pin (12) and a cam (2) on a backing plate (10), a pair of segmental brake shoe bodies (1) both ends of which seat on said anchor pin (12) and cam (2) through the function of an elastic force of a pair of return springs (13), a drum surrounding an outside of said shoe, and a lever (4) turning said cam when braking; the improvement according to which the said brake shoe comprises an upper cast wear layer (14) containing hard metal particles which is provided by casting in at a contacting part with the cam (2), said cast wear layer (14) having a hole (17) provided at a position deviated from a part (16) against which a corner (5) of the cam (2) presses, said hole (17) having a tapered shape with its inner diameter enlarged toward the cam (2) side, and a lining filled in the hole (17) of the shoe body that prevents the wear layer (14) from loosening toward the cam (2) side and from slipping off in lateral direction, curved portions (15) and (15') of said wear layer intruding into the brake shoe body (1) at least at radially inner and outer ends, the thickness (*d*) of said wear layer (14) being made sufficiently great that its surface hardness does not lower when being cast, said brake shoe being further characterized in that a lower wear layer (18) substantially the same as that at a contacting part with the cam (2) is also cast in at a contacting part with the anchor pin (12).

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**4,024,935**

## POWER TRANSMISSION IN DOUBLE-DRUM WINCH

**Yutaka Sugimoto, Hirakata, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**

**Filed July 8, 1975, Ser. No. 593,963**
**Int. Cl.² B66D *1/26***
**U.S. Cl. 192—4 R** **2 Claims**

1. Double-drum winch having a power source, a transmission with its input shaft connected to said power source and having a forward driving connection clutch, a reverse driving connection clutch and speed changing clutch means so that an output shaft of said transmission can be selectively driven in either of the forward and the reverse direction at selected one of various speeds, a reduction gear system connected to said transmission, a drum shaft connected to said reduction gear system so as to be driven thereby, a hook drum rotatably supported on said drum shaft and having a hook wire wound therearound for acutating a hook connected thereto by the rotation of said hook drum, a boom drum rotatably supported on said drum shaft and having a boom drum wound therearound for actuating a boom connected thereto by the rota-

tion of said boom drum, wherein the improvement comprises a a forward driving gear rotatably mounted on said input shaft of said transmission, a forward driving connection clutch adapted to secure said forward driving gear to said input shaft when engaged, a second input shaft rotatably mounting thereon a reverse driving gear which engages with said forward driving gear through an intermediate gear, said second input shaft fixedly mounting thereon a gear meshing with a gear secured to said first mentioned input shaft so as to be driven in the reverse direction, a reverse driving connection clutch adapted to secure said reverse driving gear to said second input shaft when engaged so that said output shaft of said transmission is driven in either of the forward and the reverse direction depending upon which of said forward and said reverse driving clutch is engaged, an intermediate shaft having a gear fixedly secured thereto which engages with said reverse driving gear so as to be driven thereby, a plurality of reduction gear sets of different reduction rations disengageably connecting said intermediate shaft to said output shaft of said transmission, speed changing clutch means adapted to selectively engage one of said plurality of reduction gear sets so as to drive said output at selected speed, a hydraulically operated hook clutch engageable with said hook drum so as to drive the same together with said drum shaft, a hydraulically operated hook brake engageable with said hook drum so as to arrest the rotation of said hook drum, hydraulically operated boom clutch engageable with said boom clutch so as to drive the same together with said drum shaft, a hydrualically operable boom brake engageable with said boom drum so as to arrest the rotation of said boom drum, a first hydraulic control system having a hook clutch actuating valve connected to said hook clutch, a hook brake actuating valve connected to said hook brake, a forward driving connection clutch actuating valve connected to said forward driving connection clutch and a reverse driving connection clutch actuating valve connected to said reverse driving connection clutch, a first manually operable means operably connected to said hook clutch actuating valve, said hook brake actuating valve, said forward driving connection clutch actuating valve and said reverse driving connection clutch actuating valve so as to selectively position the respective valves connected thereto upon selected manipulation of said first manually operable means thereby effecting selected mode of operation of said hook, a second hydraulic control system having a boom clutch actuating valve connected to said boom clutch, said forward driving connection clutch actuating valve, said reverse driving connection clutch actuating valve and a boom brake actuating valve connected to said boom brake, a second manually operable means operably connected to said boom clutch actuating valve, said forward driving connection clutch actuating valve, said reverse driving connection clutch actuating valve and said boom brake actuating valve so as to selectively position the respective valves connected thereto upon selected manipulation of said second manually operable means thereby effecting selected mode of operation of said boom and a third manually operable means operably connected to said speed changing clutch means so as to selectively change the speed of the output of said transmission by the selected operation of said third manually operable means, thereby permitting said hook and said boom to be operated at the selected speed in any of the various modes of operations of said winch by selected operation of any one or more of said first to the third manually operable means.

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**4,024,936**

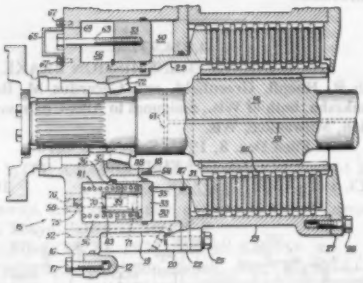
## COMBINATION VEHICLE SERVICE AND PARKING BRAKE

**Elmer R. Crabb, Pekin, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Oct. 28, 1975, Ser. No. 626,424**

**Int. Cl.² F16D 65/16**

**U.S. Cl. 192—4 A** **10 Claims**



**1.** In combination with a vehicle transmission having an input member rotatably driving a reduction section, an output shaft rotatably driven by the reduction section, and a transmission housing substantially encompassing the transmission, a vehicle brake assembly disposed in said housing and comprising:

a brake disc support cylinder rigidly associated at one end thereof with said transmission housing and surrounding said output shaft;

a plurality of interleaved braking discs disposed in said support cylinder and arranged so that one disc is slidably associated with said output shaft and the next adjacent disc is slidably associated with said brake disc support cylinder;

a first annular plate member affixed to the other opposite end of said brake disc support cylinder to retain said plurality of brake discs in the aforesaid relation;

a second annular plate member rigidly affixed to said transmission housing surrounding said output shaft and having integrally formed therewith inner and outer concentric cylindrical projections coaxially surrounding said output shaft and extending inwardly of the transmission housing, said brake disc support cylinder rigidly affixed at the inner end of the outer concentric cylindrical projection and extending therefrom inwardly of said transmission housing;

brake applicator means interposed between said housing and said plurality of interleaved braking discs and movable in a first direction for urging said interleaved braking discs toward said first annular plate member to allow said interleaved braking discs to come together in braking relation one with another to inhibit rotation of said output shaft and movable in a second direction to allow said interleaved discs to separate whereby said output shaft may freely rotate;

said brake applicator means comprising a brake disc compression member having a cylindrical shape and slidably disposed around the exterior of the inner concentric cylindrical projection, said brake disc compression member having an outwardly extending flange integrally

formed at the end adjacent to said plurality of interleaved discs, and an annular piston element surrounding and rigidly associated with said brake disc compression member and disposed between said brake disc compression member and said outer cylindrical projection to form a sealed annular spring chamber with said second annular plate member;

resilient means disposed in said annular sealed spring chamber between said annular plate member and said piston element said resilient means for urging said annular piston element and said brake disc compression member in said first direction;

release means operable for urging said brake applicator means in said second direction; and

actuator means selectively operable to act in cooperation with said resilient means for overcoming said release means to urge said brake applicator means in said first direction.

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**4,024,937**

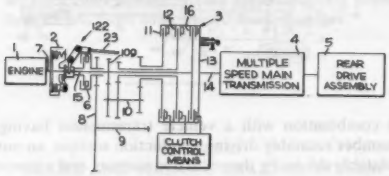
## MECHANICAL TRANSMISSION BRAKE

**Joseph R. Hoepfl, Greenfield, and Gerardus M. Ballendux, Waukesha, both of Wis., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.**

**Filed Dec. 8, 1975, Ser. No. 638,764**

**Int. Cl.² F16D** *67/02*

**U.S. Cl. 192—13 R** **10 Claims**




1. A clutch pedal operated transmission brake comprising, a power transmission clutch adapted for transmitting power to a transmission, a clutch pedal for operating the power transmission clutch, a drive shaft in said transmission, a rotating member connected to said drive shaft defining a braking surface, a brake shoe for engaging said braking surface, a cam mounted in said transmission, a follower means engaging said cam and actuating said brake shoe for engaging said braking surface, a lever on said cam, an arm on said clutch pedal, a resilient link means connected to said arm on said clutch pedal and said lever on said cam for operating said cam to thereby operate said brake when said clutch pedal is operated for disengaging said power transmission clutch.

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**4,024,938**

## CLUTCH DISK WITH PLURAL DAMPERS

**Paul Maucher, Sasbach, Germany, assignor to LuK Lamellen und Kupplungsbau GmbH, Buhl, Germany**

**Filed Sept. 30, 1975, Ser. No. 618,219**

**Claims priority, application Germany, Oct. 2, 1974, 2447015**

**Int. Cl.² F16D** *3/14*

**U.S. Cl. 192—106.2** **11 Claims**

1. Clutch disk comprising at least two damping devices disposed in an energy transfer path between a friction lining support and an output member of the clutch disk, said support and said output member rotatable relative to each other, each of said damping devices including an input part and an output member, one of said damping devices being effective over a given rotary angle by itself, and the second of said damping devices being effective over a further rotary angle, both of the output members of said first and second damping devices having profiled parts matching other mating profiled parts, the profiled part of the second of said damping devices being a hub member capable of relative rotation with respect to the profiled mating part corresponding to the rotary angle over which said first damping device is effective by itself, said output member for said first damping device disposed within

the axial extension of said hub member for said second damping device, and extends in radial direction through said hub member.

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**4,024,939**

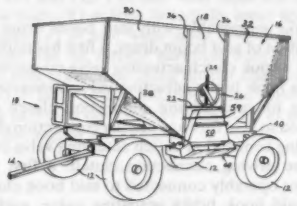
## WAGON BOX HAVING SIDE AND CENTER DELIVERY FROM ONE OPENING

**Jerry Grieshop, and Maurice Grieshop, both of Fort Recovery, Ohio, assignors to J & M Manufacturing Co., Inc., Fort Recovery, Ohio**

**Filed Feb. 23, 1976, Ser. No. 660,236**

**Int. Cl.² B65G** *11/04*

**U.S. Cl. 193—5** **9 Claims**



1. In a box adapted to be a part of a wagon, the box having a side wall portion and a bottom portion, there being an opening in the side wall portion adjacent a lower part thereof, the improvement comprising:

a plurality of chutes carried by the box adjacent the opening, there being a first chute and a second chute, the first chute having a connector part attached to the box adjacent the opening and an end part spaced from the connector part, the first chute being movable to a position in which the end part is positioned laterally from the box to receive material flowing from th opening to the first chute and to discharge the material from the first chute to a position laterally spaced from the box, the first chute being movable to a position in which the end portion is at a higher elevation than the connector part, the second chute being attached to the box and having an entrance portion adjacent the opening, the second chute being adapted to receive material flowing from the opening to the entrance portion thereof to discharge material from the second chute to a position below the box.

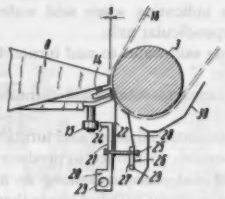
## 4,024,940
## MATRIX PRINTER HAVING DOCUMENT THICKNESS COMPENSATING DEVICE

**Wolfgang Hendrischk, Neu-Ulm; Hubert Ott; Wolfgang Seybold, both of Ulm; Horst Heisele, Asselfingen, and Karl Mayr, Niederstotzingen, all of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Germany**

**Filed Apr. 13, 1976, Ser. No. 676,482**

**Int. Cl.² B41J** *3/50, 3/04*

**U.S. Cl. 197—1 R** **6 Claims**



1. In a matrix printer having a reciprocating carriage disposed for movement along a printing platen, further having a printing head mounted on the carriage for reciprocating motion towards and away from the printing platen, the combination comprising:

a first roller journalled on the head;

a pivotal flap extending for substantially the length of the platen and having a pivot axis which extends parallel to the direction of extension of the platen as well as of carriage movement, said flap having a rigid mounting bar;

a resilient support sheet mounted on said bar of said flap and extendng between the platen and the first roller, the first roller rolling on said sheet when said head is in a protracted position for printing;

a second roller journalled on the head; and

means for engaging said second roller for retracting the head on the carriage.

## 4,024,941
## DOT MATRIX TYPE SERIAL PRINTER

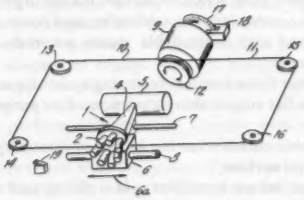
**Aisuke Sekikawa, and Takahiko Aragaki, both of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan**

**Filed Dec. 11, 1975, Ser. No. 639,853**

**Claims priority, application Japan, Dec. 18, 1974, 49-145161**

**Int. Cl.² B41J** *3/04*

**U.S. Cl. 197—1 R** **3 Claims**



1. A dot matrix type serial printing device comprising:

a movably mounted carriage; a printing head assembly on said carriage, said head including a set of linearly aligned print wires and electromagnetic actuator means for driving the print wires; a step motor having an output shaft and operatively connected with said carriage to impart a transverse feed and a return movement to said carriage; a rotary disc fixedly mounted on the output shaft of said motor and formed with a circularly arcuate slot with opposite end edges therein and a circular row of equally spaced radially aligned slits, said slot and said row being in concentric relation with each other around the axis of said rotary disc, said radial slits being equal in number to that of the operation steps of said step motor in each revolution thereof; stationary detector means including first and second photoelectric sensors arranged with respect to said rotary disc to respectively scan said arcuate slot and said row of slits as said step motor rotates said rotary disc; said detector means generating a signal defining a print starting end position for said printing head assembly by detecting one of the opposite end edges of said arcuate slot in said rotary disc as said end edge is detected by the first of said photoelectric sensors and wherein said printing head assembly and step motor are controlled to operate in timed relation to each other as said radial slits in said rotary disc are successively detected by the second photoelectric sensor.

## 4,024,942
## PRINTER WITH A PAPER GUIDE SEPARATE FROM THE PRINTER FRAME

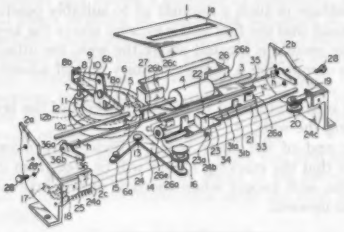
**Noboru Kawaji, Ichikawa, Japan, assignor to Copal Company Limited, Tokyo, Japan**

**Filed Oct. 31, 1975, Ser. No. 627,919**

**Claims priority, application Japan, Nov. 8, 1974, 49-134461[U]**

**Int. Cl.² B41J** *11/20*

**U.S. Cl. 197—127 R** **2 Claims**



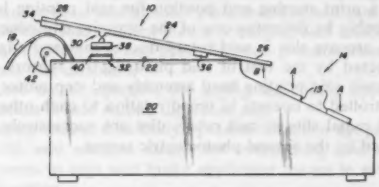
1. A printing device having a printer frame, at least a printing head, a platen arranged in facing relationship to said printing head so as to cooperate therewith for a printing operation, and a paper guide for guiding and feeding a paper sheet to be imprinted between said printing head and said platen, the improvement comprising a frame body formed integral with said platen and said paper guide, said printing head being movable in said printer frame, said frame body forming with said paper guide an assembly assemblable independently of said printer frame, a shaft extending through said frame body and said printer frame, and wherein said frame body is swingably supported in said printer frame by said shaft, said frame body having at least a recessed portion at an end thereof adjacent to an inner wall of said printer frame and remote from a position at which said shaft extends through said frame body, at least a lever having a shaft-proximal end being supported at said proximal end by said shaft between said inner wall of said printer frame and said end of said frame body, said lever having an arm engageable in said recessed portion of said frame body, whereby the position of said platen relative to said paper guide is maintainable upon adjustment of the position of said platen with respect to said printing head without impairing the paper sheet guidance of said paper guide, and the adjustment of the angular position of said frame body is facilitated by manipulation of said lever.

4,024,943

## MARKING APPARATUS FOR STENOGRAPHIC TYPEWRITER OR THE LIKE

Dennis D. Steiner, 4115 Underwood Place, Reno, Nev. 89501

Filed Jan. 13, 1976, Ser. No. 648,678
Int. Cl.² B41J 29/40
U.S. Cl. 197—180 5 Claims



1. A marking element for use with a mechancial symbol transcribing apparatus manually operated from a keyboard, the apparatus adapted to generate a permanent record on a web being moved lengthwise through the apparatus, the apparatus comprising a case having a surface positioned between the keyboard and the web, the novel marking element comprising

a lever having a first end adapted to be positioned adjacent to the keyboard and a second end adapted to be positioned adjacent to the web,

a fulcrum means located between the first and second ends of the lever for pivotally supporting the lever for movement in a substantially vertical plane, the fulcrum means comprising a strip adjoining a lower side of the lever, the strip having an advantageously narrowed region forming a hinge,

an attachment means for attaching the fulcrum means to said surface in such a manner as to suitably position the lever such that the first end is located above the keyboard and the second is located above the web, the attachment means comprising a complementary pair of adhesive pile strips, and

marking means attached to the second end of the lever for marking the web,

the first end of the lever being sufficiciently massive to ensure that the marking means will be free from contact with the web except when the first end is manually deflected upward.

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4,024,944

## SEMICONDUCTOR SLICE PREALIGNMENT SYSTEM

Anthony Lionel Adams, McKinney, and Claude Dedmond Head, III, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 24, 1975, Ser. No. 644,225
Int. Cl.² B65G 47/24
U.S. Cl. 198—394 51 Claims

1. A system for accurately aligning a generally circular wafer member having a flat region along a portion of its periphery comprising:

a. a turntable means mounted for rotation about a central axis perpendicular to its surface;

b. conveyer means to deliver said wafer member gently to a position at rest on said turntable,

c. a moveable stop member including an arcuate bumper member of resilient cushioning material, the arc of said bumper being of essentially the same radius as that of said wafer member and of a length greater than the arc of said wafer member subtended by said flat region of its periphery;

d. means to move said stop member to various positions between and including a first position wherein the bottom edge of said bumper is in contact with said turntable and the center of the arc of said bumper member lies on said central perpendicular axis of said turntable and a second position in which said bumper member is sufficiently spaced from a wafer member centered on the axis of said turntable that rotation of said wafer member is not impeded by said bumper;

e. means providing a fluid film to support said wafer member just above said turntable;

f. means urging said wafer member into contact with said bumper member in said first position thereby centering said wafer for rotation;

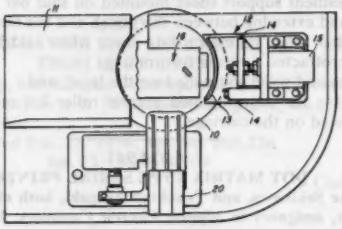
g. sensor means indicating when said wafer is centered about said perpendicular axis;

h. means clamping said wafer to said turntable in said centered position;

i. controllable means to rotate said turntable about said central axis;

j. a sensor array mounted adjacent said turntable and having at least three sensors positioned to produce sensing areas in the plane of said wafer and along an arc of a circle having a radius co-linear with but larger than the radius of said wafer member and within a spacing no greater than the length of the flat region of said wafer periphery, the middle one of said sensing areas being nearest said perpendicular axis of said turntable;

k. controllable means to produce relative movement between said sensing areas and a centered wafer member in a direction parallel to said co-linear radii; and



l. means responsive to all of said sensor means to control operations of said means to move said stop member, said means providing a fluid film, said means urging said wafer, said means clamping said wafer, said control means to rotate and said controllable means to produce relative movement.

39. A system for accurately centering a circular wafer member having a flat region along a portion of its periphery comprising:

a. a turntable member having an axis of rotation perpendicular to its surface;

b. conveyer means to deliver said wafer to said turntable;

c. moveable stop member including an arcuate bumper member of resilient cushioning material, the arc of said bumper being essentially of the same radius as said wafer member and of a length greater than the arc of said wafer member subtended by said flat region;

d. means to position said stop member on said turntable such that the center of the arc of said bumper member lies on said axis of rotation;

e. means providing a fluid film to support said wafer member just above said turntable; and

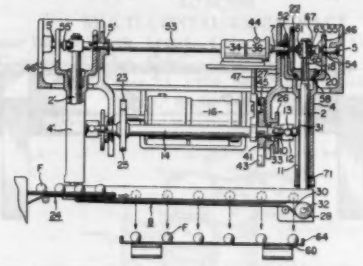
f. means urging said wafer member into contact with said bumper member thereby centering said wafer for rotation.

4,024,945

## APPARATUS FOR TRANSFERRING FORMED UNBAKED AND BAKED DOUGH AND CONFECTIONARY FROM A FEED CONVEYOR THROUGH A TRANSFER CONVEYOR ONTO A RECEIVING CONVEYOR

Hirobumi Mugishima, 1170, Hei, Nissato, Utsunomiya, Tochigi, Japan

Filed Feb. 9, 1976, Ser. No. 656,364
Claims priority, application Japan, Feb. 10, 1975, 50-17144
Int. Cl.² B65G 47/26
U.S. Cl. 198—424 1 Claim



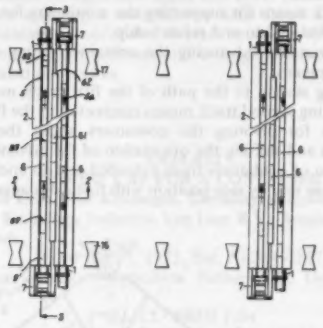
1. An apparatus for transferring formed articles such as confectionery, bread or the like from a feed conveyor onto a receiving conveyor comprising a displaceable transfer belt conveyor which rceives articles from the feed conveyor and transfers them to the receiving conveyor first, means for driving the belt of said transfer conveyor for reception and positioning of said articles thereonto and second means for causing said transfer conveyor to move substantially downwardly and then swing substantially laterally with a changeable radius of rotation about an axis fixed parallel to the direction of movement of the belt of said transfer conveyor and positioned thereabove, and finally return to its original position said first means comprising a drive roller engaging the belt of said transfer conveyor for driving said belt, at least one vertical rod operatively connected at its bottom portion to said drive roller perpendicularly thereto, a first motor, and a transmitting means for transmitting the driving force of said motor to said vertical rod thereby to rotate it about its own axis, characterized in that said second means comprises means for rotating said vertical rods about said fixed axis, containing at least one cylindrical housing mounted so as to be swingable about said fixed axis and encasing said vertical rod so as to allow the axial rotation and lengthwise sliding motion of said vertical rod, a longitudinally elongated slot formed on said cylindrical housing at the desired position, an elongated pin parallel to said fixed axis adapted to engage said slot slidably, a crank arm elastically supporting said pin at one end, said crank arm being fixedly secured to a crankshaft and rotatable thereby to cause said pin to perform a substantially circular motion, a cam for restricting the motion of said pin to follow the surface of said cam in cooperation with the action of said spring, and a second motor for rotating said crank arm for a full turn after the predetermined number of articles are fed onto said transfer conveyor, and means for changing the radius of rotation containing a guide plate secured fixedly to said crankshaft, which is provided with an annular slot forming a predetermined cam surface, rod means provided with a roller which slidably fits in said annular slot, said rod means being pivotably mounted at one end on said crankshaft, a spline formed on said vertical rod and said transmitting means thereby to allow said vertical rod to slide through said transmitting means, and a mechanism which is adapted to displace said vertical rod vertically in response to the lengthwise movement of said rod means which is caused by the coaction of said roller and said annular slot during the rotation of said guide plate.

4,024,946

## TRANSVERSE MOVEMENT OF ELONGATED STOCK

Manfred Müller, Dusseldorf, and Klaus-Peter Schirmag, Lintorf, both of Germany, assignors to Mannesmannrohren-Werke AG, Dusseldorf, Germany

Filed May 27, 1975, Ser. No. 580,917
Claims priority, application Germany, May 30, 1974, 2426354
Int. Cl.² B65G 37/00
U.S. Cl. 198—570 5 Claims



1. In an apparatus for transversely moving elongated stock, such as pipes, a device comprising:

a first elongated member extending in the direction of desired transportation and having a plurality of shoes defining an alternating sequence of oppositely inclined stop and roll-off surfaces;

a second elongated member placed along-side of said first member and having a plurality of stationary, asymmetrical shoes defining an alternating sequence of oppositely inclined, relatively steep stop surfaces and more gradually inclined roll-off surfaces and arranged to be offset in the said direction and in relation to the shoes of the first member in that neither crests nor valleys of the shoes of one of the members are laterally aligned with valleys or crests of the respective other member;

a third member also placed alongside said first member and having shoes similar to the shoes of the second member but with reversed orientation as to the stop and roll-off surfaces;

first tubular, inflatable and deflatable means for supporting the second member to move the second member up and down in the offset positions of the shoes so that the stock rolls on the roll-off surfaces of the shoes of the first member and on the roll-off surfaces of the shoes of second member in alternating sequence; and

second tubular inflatable and deflatable means for supporting the third member to move the third member up and down so that the stock rolls on the roll-off surfaces in directions opposite to the direction of rolling by operation of the tubular means operating the second member; only one of the second and third members at a time moving up and down while the respective other one is held down.

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4,024,947

## BULK MATERIAL CONVEYOR

Ernst G. Knolle, 2691 Sean Court, South San Francisco, Calif. 94080

Filed Apr. 29, 1976, Ser. No. 681,512
Int. Cl.² B65G 17/12
U.S. Cl. 198—707 9 Claims

1. A bulk material conveyor, comprising:

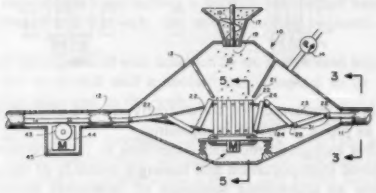
a chain of elongated containers, each having an open end and a closed end and first and second opposed sides;

hinge means connecting each container with the preceding and succeeding containers, each container being connected by said hinge means at the first side of its open end to the first side of the open end of an adjacent container, and each container being connected at the second side of its closed end to the second side of the closed end of an adjacent contaner, so that when in extended end to end relationship, the chain of containers has aligned first sides and aligned second sides and each container has its open end facing the open end of one adjacent container and its closed end facing the closed end of the other adjacent container;

first track means for supporting the containers for travel in extended end to end relationship;

drive means for advancing the containers along said first track means;

a loading station in the path of the first track means and including second track means connected to the first track means for pivoting the containers about their hinge means and shifting the orientation of the advancing succession of containers from extended end to end position to dense side by side position with first sides adjacent and



second sides adjacent and all open ends oriented in one direction, and for maintaining the side by side orientation through a loading distance;

said loading station including means for feeding bulk material into the open ends of the containers as the containers pass in side by side position through said loading distance;

means on the open ends of the containers for substantially sealing each container with an adjacent container as the containers advance in extended end to end relationship; and

an unloading station in the path of the first track means and including second track means connected to the first track means and similar to the second track means at the loading station;

said unloading station including means for unloading the bulk material from the containers as they pass ins ide by side position through an unloading distance;

whereby the containers may be loaded through their open ends while slowly advancing through the loading station; in dense side by side orientation, then advanced at a higher speed in extended end to end relationship toward the unloading station, and unloaded in side by side orientation at the slower speed.

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**4,024,948**

## CONVEYOR TRACK APPARATUS FOR LOGS

**Jan Persson, Gardet, Acklinga, 522 00 Tidaholm, Sweden**

**Continuation of Ser. No. 615,057, Sept. 19, 1975, abandoned, which is a continuation of Ser. No. 501,074, Aug. 27, 1974, abandoned. This application June 17, 1976, Ser. No. 697,218**

**Claims priority, application Sweden, Aug. 31, 1973, 73118556**

**Int. Cl.[2] B65G** *47/94*

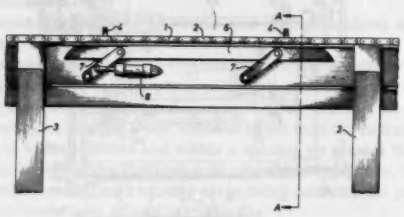
**U.S. Cl. 198—796** **2 Claims**

1. In a conveying-and-discharge apparatus for elongated articles such as logs or the like, comprising in combination;

A. an endless conveyor including a generally horizontal upper run, said endless conveyor comprising a pair of laterally-spaced, flexible elements disposed in the upper run of the conveyor, said endless conveyor including support elements secured to and bridging the laterally-spaced flexible elements for supporting elongated articles thereon, the support elements including an upper support surface having a shallow-recess for extending transversely of and stabilizing the elongated articles being conveyed;

B. pairs of rigid, lifting elements disposed in mutually parallel relation with respect to each other and in vertical alignment with a respective flexible element of said conveyor, said lifting elements spaning a substantial length of the conveyor run;

C. pairs of articulated links pivotally connected between a fixed support and in longitudinally space relation to a



respective rigid lifting element for restraining upward movement of the rigid lifting element in parallel relation relative to the conveyor run whereby upward movement of the rigid element will engage and raise one or the other of said flexible elements of the endless conveyor and tilt an elongated article laterally to one side or the other of the conveyor run; and

D. means operatively connected to at least one of said pairs of articulated links operatively connected to a respective lifting element for pivoting said one link about the fixed support and causing the rigid lifting element to move vertically and discharge an article laterally off the conveyor.

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**4,024,949**

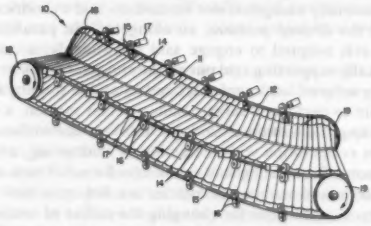
## TRAVERSE BENDABLE ENDLESS BELT CONVEYOR

**William K. Kleysteuber, Wexford, and William J. Peterson, Jr., Coraopolis, both of Pa., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.**

**Filed Aug. 11, 1975, Ser. No. 603,422**

**Int. Cl.[2] B65G** *15/00*

**U.S. Cl. 198—818** **7 Claims**



1. An endless conveyor apparatus capable of transverse bending to accommodate a curve lying substantially in the horizontal plane comprising:

an endless conveyor belt capable of transverse bending,

first and second elongated elastic means flexibly attached to and extending along respective edges of said belt,

frame means,

means to guide and hold said elastic means under tension, said guiding and holding means comprising a plurality of

pairs of opposed guide rollers engaging said first and second elastic means at intermediate points along the length of said conveyor belt;

drive means for said belt, and

means on said frame means to adjust said guide means to transversely bend said belt around the curve,

said first and second elastic means being pretensioned sufficiently to support the respective belt edge to resist catenary sag adjacent the inside transverse bend radius to prevent spilling of the load when the conveyor belt travels around the curve.

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**4,024,950**

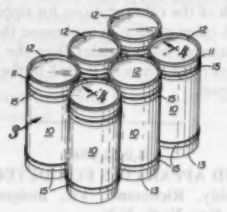
## MULTI-CONTAINER PACKAGE

**Elmer Daniel Werth, Arvada, Colo., assignor to Adolph Coors Company, Golden, Colo.**

**Filed June 21, 1976, Ser. No. 698,164**

**Int. Cl.² B65D** *71/02, 63/10*

**U.S. Cl. 206—150** **4 Claims**



1. A multi-container package including a plurality of rows of cylindrical containers and a plurality of cylindrical containers in each row, comprising

a. series of connected plastic bands each surrounding and engaging the cylindrical body of one of said containers adjacent its upper end,

b. a second series of connected plastic bands each surrounding and engaging the cylindrical body of one of said containers adjacent its lower end, said two series of bands holding the containers in axially parallel relationship during transportation and handling,

c. connecting means between the bands on containers opposite each other in a plurality of rows, said connecting means being weakened along vertical lines and tearable in response to restrained limited pulling force applied to one end of one of said opposite containers in a predetermined direction, and

d. connecting means between the bands on containers adjacent each other in the same row, said connecting means being weakened along horizontal lines and tearable in response to restrained limited lateral force applied to one of said adjacent containers in the same row in another predetermined direction.

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**4,024,951**

## CUP AND PACKAGE OF CUPS

**John Foster Green, Wood Dale, Ill., assignor to Compact Industries, Inc., Schaumburg, Ill.**

**Filed May 12, 1975, Ser. No. 576,464**

**Int. Cl.² B65D** *62/00, 85/72*

**U.S. Cl. 206—217** **8 Claims**

1. A package of cups with deliquescent or hygroscopic material for use in the dispensing of beverages or food products comprising:

a plurality of cups telescoped together into a stack, each of said cups having a peripheral wall portion and a bottom wall defining an upwardly opening cup,

shoulder means on said cups defined interiorly of said peripheral wall portion and integrally formed on the cups above their respective bottom walls, each of said cups further having a bottom annular marginal portion including an annular radially extending surface in substantially particle-sealed contact with said shoulder means of the cup nested therebelow and defining a substantially particle-sealed enclosure therebetween,

a measured quantity of material provided within said sealed enclosure,

said peripheral wall portion including a lower portion of substantially frusto-conical shape extending upwardly from said bottom wall to said shoulder means,

said peripheral wall portion including an upper portion offset outwardly in a radial direction from said shoulder means to the upper end of the cup, said shoulder means located between said upper and lower portions, and

means applying a compressive axial force to said stack maintaining said sealed contact between adjacent cups to limit entry of moisture and exiting of material from said sealed enclosures.

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**4,024,952**

## SCREW CAP FOR A CONTAINER

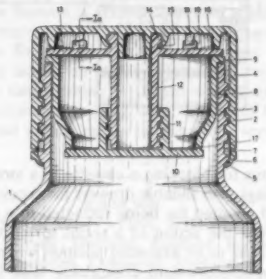
**Wilfried Leitz, Bad Krozingen, Germany, assignor to Koninklijke Emballage Industrie Van Leer B.V., Amstelveen, Netherlands**

**Filed Oct. 3, 1975, Ser. No. 619,257**

**Claims priority, application Netherlands, Oct. 3, 1974, 7413077**

**Int. Cl.² B65D** *1/04*

**U.S. Cl. 206—221** **9 Claims**



1. A container having a screw threaded neck and a screw cap, said cap having a compartment therein for holding material, said compartment being defined by a separate annular wall in frictional contact with the inner surface of the screw-threaded neck and a bottom, means releasably connecting said bottom and the cap for pressing said bottom upwardly against the lower edge of the annular wall, said means being so constructed that said cap is rotatable with respect to the bottom and that upon unscrewing of said cap, said bottom is released.

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**4,024,953**

## BATTERY SNAP TERMINAL

**William Kirby Nailor, III, Mechanicsburg, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

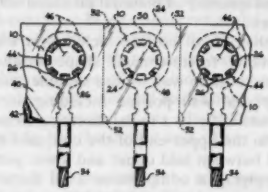
**Division of Ser. No. 626,030, Oct. 28, 1975, Pat. No. 3,980,388. This application June 18, 1976, Ser. No. 697,549**

**Int. Cl.² B65D** *85/00*

**U.S. Cl. 206—344** **2 Claims**

1. A package of battery snap terminals comprising first and second strips of insulating material, a plurality of battery snap terminals disposed between the strips of insulating material, each battery terminal comprising a ring having a plurality of inclined fingers extending inwardly of said ring, each finger including a first shoulder directed inwardly of said ring and a second shoulder directed outwardly of said ring, and each

strip of insulating material including a plurality of openings alternately spaced with regard to said terminals to correspond



with the inwardly directed shoulders and outwardly directed shoulders on alternate terminals.

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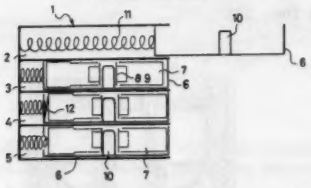
**4,024,954**

## APPARATUS FOR BLOCKING A CASSETTE IN A STORAGE MAGAZINE

**Marcel Jules Helene Staar, 479 Avenue Louise, Brussels, Belgium**

**Filed Dec. 18, 1975, Ser. No. 642,175**
**Claims priority, application Belgium, Dec. 18, 1974, 823527**
**Int. Cl.² B65D** *85/672*
**U.S. Cl. 206—387** **8 Claims**



1. Apparatus for blocking a cassette in a storage magazine having housings with slidable drawers for receiving respective cassettes and adapted for being retracted in a stored, locked position against the action of a recall spring which can displace the drawer to an extended position when the drawer is unlocked, an improvement comprising stud means on said drawers loosely engaging bores in reels in said cassettes, and means enabling the recall spring to act on said cassette in the associated drawer at least during retraction of said drawer taking up the play both between the stud means and the reels in the cassette to block movement of the reels by said stud means.

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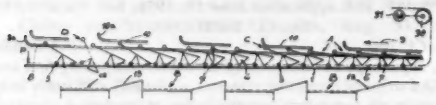
**4,024,955**

## AUTOMATIC SORTER FOR FRUITS AND THE LIKE

**Claude Joseph Rousselie, Les Livonnieres, 49480 St Sylvain D'Anjou, and Pierre Lacharlotte, 15, rue Saint Evroult, Angers, both of France**

**Filed Sept. 29, 1975, Ser. No. 617,845**
**Claims priority, application France, June 24, 1975, 75.19680**
**Int. Cl.² B07C** *5/16*
**U.S. Cl. 209—121** **8 Claims**



1. An apparatus for sorting objects by weight, said apparatus comprising:

an elongated drive element defining a transport path and provided with a succession of pivots defining a succession generally parallel axes transverse to said path,

a car rockable on each of said pivots and having a counterweight to one side of the respective pivot and a receptacle adapted to hold a respective one of said objects to the other side of the respective pivot, each counterweight lying alongside and directly flanking the receptacle of an adjacent car,

a plurality of sorting stations below and spaced along said path,

means connected to said drive element for displacing the succession of said cars along said path past said stations in a transport direction,

means at the furthest upstream station for tipping each car from a median position about its axis as it passes said furthese upstream station through a predetermined angular distance in a sense shortening the horizontal distance between the center of gravity of the counterweight and the axis relative to the horizontal distance between the center of gravity of the object and the axis, and

means at each of the other stations for tipping each car as it passes each other station in said sense through respective angular distances each greater than the angular distance through which the car was tipped in the station immediately upstream.

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**4,024,956**

## METHOD AND APPARATUS FOR DETECTING LEAKS

**Bruce P. Cassidy, Richmond, Va., assignor to American Brands, Inc., New York, N.Y.**

**Filed Nov. 20, 1975, Ser. No. 633,984**
**Int. Cl.² B07C** *1/10*
**U.S. Cl. 209—73** **15 Claims**

1. An apparatus for use in continuously testing for leaks in a plurality of generally fluid-tight and flexible packages which are conveyed along a predetermined path comprising first means for continuously conveying a plurality of the packages along the predetermined path, second means operatively connected to the first means for applying compressive forces for compressing the generally fluid-tight packages as they are continuously conveyed along the predetermined path to the extent that those packages which do not have leaks expand in directions which are free from compressive forces by at least a predetermined amount and whereas those packages which have leaks will not expand by the predetermined amount, and third means being operatively connected to said second means for at least monitoring the existence of the predetermined expanded packages by cooperating with the predetermined expanded portions of the packages as the packages are continuously advanced to thereby enable defective leaking packages to be removed.

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**4,024,957**

## CRANE WITH FOLDABLE BOOM

**Jerome J. Schleis, Denmark, Wis., assignor to Northwest Engineering Company, Green Bay, Wis.**

**Filed July 25, 1975, Ser. No. 599,167**
**Int. Cl.² B66C** *23/62*
**U.S. Cl. 212—144** **7 Claims**

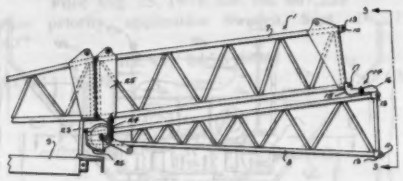
7. In a crane mounted at its rearward end on a supporting means:

a. an inner boom section connected through its rearward end to said supporting means,

b. an outer boom section normally extending forwardly

from said inner section and adapted for folding retraction in a rearward direction relative to the latter,

c. and means to shift the inner terminus of said outer boom section to a position which is longitudinally forwardly of its former normal position when said outer section is foldingly retracted,



d. said shifting means comprising at least one compound arm extending between said boom sections and forwardly from said inner boom section,

e. said arm comprising a pair of pivotally connected legs connected at a pivot point which lies outwardly and forwardly of said inner boom section, said legs being mutually coextensive from end to end when said outer boom section is extended.

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**4,024,958**

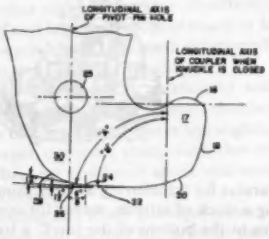
## COUPLER KNUCKLE CONTOUR

**Horst Thomas Kaufhold, Chicago, Ill., assignor to Amsted Industries Incorporated, Chicago, Ill.**

**Filed Feb. 17, 1976, Ser. No. 658,472**

**Int. Cl.² B61G *3/04***

**U.S. Cl. 213—152** **4 Claims**




1. In a coupling arrangement for opposed Type E railway car couplers which approach for coupling with the longitudinal axes thereof angularly related to each other at angles of from 0° to 13 ½°, each coupler having a head with a front buffing face and a knuckle pivoted to the head, the knuckle having a nose portion and a heel portion with a pivot pin hole therethrough, the improvement wherein each knuckle has a front face including a first flat surface extending transversely of the associated coupler when the knuckle is in closed position, and a second flat surface sloping rearwardly from said first surface at an angle of approximately 12° and merging wth the heel portion, said first and second surfaces intersecting at a point between the longitudinal axis of the associated coupler and a line parallel to that axis through the center of the pivot pin hole in the heel portion of the knuckle.

**4,024,959**

## MECHANICAL HANDLING APPARATUS

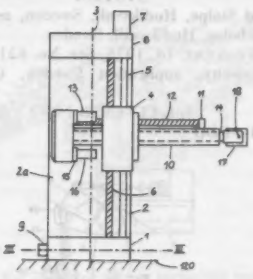
**Hans Gruner, Hausen, Germany**

**Filed Nov. 11, 1974, Ser. No. 522,991**

**Claims priority, application Germany, Nov. 9, 1973, 2355971**

**Int. Cl.² B25J *19/00***

**U.S. Cl. 214—1 BB** **22 Claims**



1. A handling device with a flexible gripper and having drive means for moving said gripper, said drive means comprising a displaceable force transmitting member, means for exerting an adjustable force on said member for normally preventing movement thereof, said means permitting movement of said member in response to stoppage of movement of said gripper when the force thereon is greater than said adjustable force, switch means responsive to movement of said member against said adjustable force for controlling said drive means, the actuating force acting on said gripper being transmitted by said gripper to said member in the drive associated with the first gripper movement causing said member to be displaced and actuate said switch means to initiate a second gripper movement.

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**4,024,960**

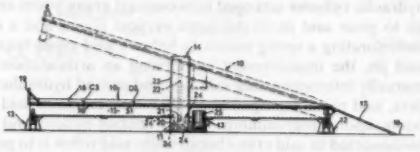
## APPARATUS FOR ELEVATING WHEELED VEHICLE

**Brian Michael Forster, Sheffield, England, assignor to GKN Transmissions Limited, Erdington, England**

**Filed May 1, 1975, Ser. No. 574,380**

**Int. Cl.² B60P *1/04***

**U.S. Cl. 214—1 A** **5 Claims**



1. Apparatus for supporting a wheeled vehicle in an elevated position, comprising:

a vehicle receiving platform;

a member providing support for said platform in the mid region of the length therof;

elevator means operable to raise and lower said member for moving said platform from a substantially horizontal lowered loading position to an inclined working position;

bearer means providing pivotal support for said platform about respective horizontal axes transverse to the length thereof and situated adjacent to the ends of said platform;

respective hold-down means for each of said bearer means, each including a holding member settable to a retaining position for preventing upward movement of the associated end of said platform, and a releasing position permitting movement of the associated end of said platform; and

means associated with each holding member for preventing movement of the latter from its retaining position to its releasing position unless said platform is in its lowered loading position.

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**4,024,961**

## INDUSTRIAL ROBOT COMPRISING A CONTROL SYSTEM

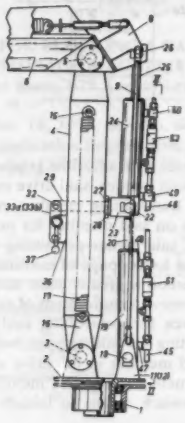
**Jens Torvald Stolpe, Hudiksvall, Sweden, assignor to Hiab-Foco Aktiebolag, Hudiksvall, Sweden**

**Filed Oct. 14, 1975, Ser. No. 621,758**

**Claims priority, application Sweden, Oct. 14, 1974, 7412880**

**Int. Cl.² G05B** *19/42*

**U.S. Cl. 214—1 BD** **3 Claims**



1. An improved industrial robot incorporating a control system, comprising a support, a bracket mounted for rotation relative to said support, a crane boom the lower end of which is pivotally mounted about a horizontal shaft on said bracket, a jib one end of which is pivotally mounted about a horizontal shaft provided at the upper end of said crane boom, a tool attachment means supported by said jib, a first hydraulic cylinder arranged between said bracket and said crane boom to pivot said crane boom in a vertical plane, and a second hydraulic cylinder arranged between said crane boom and said jib to pivot said jib in the same vertical plane, and a device incorporating a spring means to balance said crane boom and said jib, the improvement comprising an ariticulation piece mutually interconnecting said first and second hydraulic cylinders, said piece arranged to be disconnected from said crane boom upon programming of said control system and to be reconnected to said crane boom when said robot is to perform the operations in accordance with the chosen programme, a rod on said articulation piece, a first conical portion provided on said rod adjacent said articulation piece, a second conical portion of corresponding shape provided on said crane boom and arranged to be tightened into firm engagement with said first conical portion upon interconnection between said articulation piece and said crane boom.

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**4,024,962**

## CAR DUMPER SCALE

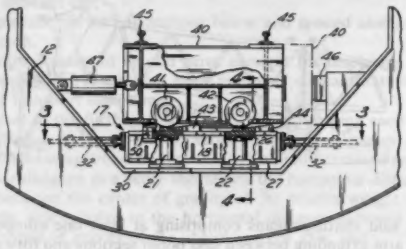
**Edward E. Cheek, Brunswick, and Kuljit S. Tuli, Highland Heights, both of Ohio, assignors to The McDowell-Wellman Engineering Company, Cleveland, Ohio**

**Filed Oct. 6, 1975, Ser. No. 619,608**

**Int. Cl.² G01G** *19/52*

**U.S. Cl. 214—2** **6 Claims**

1. A railroad car dumper and scale comprising a substantially invertible supporting cradle, a weighing table fixed to said cradle and being invertible therewith, a platen mounted on said table and being laterally shiftable along said table, roller means between said table and said platen to permit said shifting, means to invert said cradle, track means on said platen adapted to support a railroad car, clamp means to hold a railroad car on the track means during inversion of the



cradle, means to actuate said clamp means after said cradle is rotated to a position wherein the platen and the car are shifted by gravity to a position wherein the car abuts one side of the cradle, and weight sensing means fixed to the cradle and having an abutment surface compressively engaged by said table when said cradle is in its upright position and being under zero tension when said cradle is inverted.

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**4,024,963**

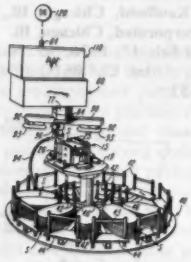
## APPARATUS FOR TRANSFERRING ARTICLES

**Charles F. Hautau, 146 Hilltop Road, Oxford, Ohio 45056**

**Filed May 7, 1975, Ser. No. 575,256**

**Int. Cl.² B65G** *60/00*

**U.S. Cl. 214—6 BA** **4 Claims**

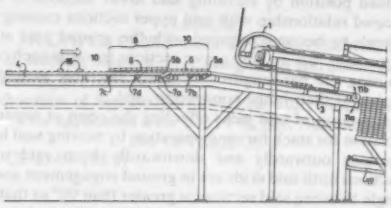


1. Apparatus for transferring articles, comprising means for supporting a stack of articles, means for continuously supplying articles to the bottom of the stack, a transfer mechanism including a rotary input shaft and a rotary output shaft, first cam actuated means for intermittently indexing said output shaft in one direction in response to continuous rotation of said input shaft in one direction, a transfer arm including means for engaging each article on the top of the stack, means connected to said output shaft and supporting said transfer arm for indexing with said output shaft and for axial movement relative to said output shaft, second cam actuated means driven by said input shaft for producing reciprocating axial movement of said transfer arm in response to said rotation of said input shaft for moving said article engaging means to pick up and article on the top of the stack, and said first cam actuated means cooperate with said second cam actuated means to produce synchronized compound rotary indexing and axial movement of said transfer arm and said article engaging means in response to continuous rotation of said input shaft for successively transferring articles from the stack.

## 4,024,964
## DEVICE FOR STACKING PIECES OF BOARD OR LUMBER

Nils-Erik Hellstrom, Nyland, and Bengt Artur Berg, Bolstabruk, both of Sweden, assignors to AB Hammars Mekaniska Verkstad, Nyland, Sweden

Filed Aug. 25, 1975, Ser. No. 607,222
Claims priority, application Sweden, Sept. 16, 1974, 7411637
Int. Cl.² B65G 57/18
U.S. Cl. 214—6 DK 2 Claims



1. A device for stacking pieces of board or lumber comprising:

a lower conveyor, having a transport plane for transversely conveying layers of said pieces of board or lumber in a transport direction at a first substantially constant velocity;

an upper conveyor having its transport direction arranged substantially parallel to said lower conveyor, overlapping one end of said lower conveyor, having a plurality of L-shaped carrying members with an open end of said members opening opposite said transport direction, said members being formed by a first leg attached to said upper conveyor and a second leg of sufficient length to carry one of said layers of pieces of board or lumber, said upper conveyor having a second substantially constant velocity less than said first velocity;

said upper conveyor timed in relation to said layers of pieces such that one of said L-shaped members passes in front of one of said layers of pieces and slightly below said lower conveyor transport plane, such that said layer of pieces will become positioned above said second leg in a receiving position;

means for lowering said lower conveyor when said layer of pieces is above said second leg, prior to passing beyond the end of said lower conveyor, such that said layer of pieces will be laid upon said second leg;

means for raising said lower conveyor back to said transport plane prior to the arrival of the next one of said layer of pieces; and

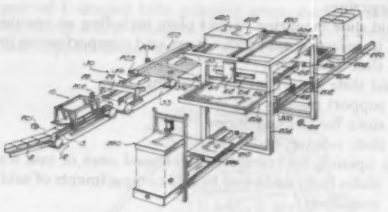
at least one stacking station located beneath said upper conveyor in said transport direction;

said stacking station including a stack supporting member vertically adjustable downward from an upper position immediately below the second leg of an L-shaped member passing thereover, said stack supporting member generally paralleling the second leg and receiving a layer of pieces therefrom without disruption of the layer, said stack support member being adjustable downward in increments each approximately equal to the height of a layer.

## 4,024,965
## BAG PALLETIZING APPARATUS

Gerald A. Marth, Waukesha; Wayne E. Hunnicutt, Big Bend, and Daniel Lee Jones, Waukesha, all of Wis., assignors to Manierre Corporation, Waukesha, Wis.

Filed Oct. 15, 1975, Ser. No. 622,562
Int. Cl.² B65G 57/24
U.S. Cl. 214—6 P 3 Claims

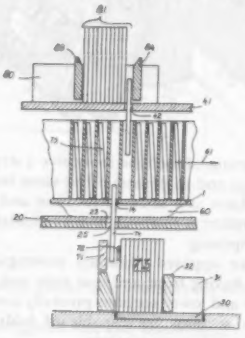


1. Apparatus for palletizing bags including means for supplying bags, a row forming station, bag diverter means located intermediate said row forming station and said means for supplying bags, said bag diverter means including a bag diverter assembly and a diverter conveyor, means for selectively moving said diverter assembly between first and second positions to change the path of movement of bags into first and second lanes on said diverter conveyor, and turning means associated with one of said lanes and selectively engageable with bags traveling in said lane to rotate selected bags 90 °from the bag orientation of bags traveling in the other of said lanes to form a pre-selected row pattern of bags at said row forming station and wherein said turning means includes a turning post located in the path of travel of bags in one of said lanes, and a turnpost deflector movable from a retracted position exposing said post for engagement with the bags in said one lane to an advanced position to direct bags into a clearance position with respect to said turning post to prevent engagement of said bags with said turning post and thus prevent a change of orientation of said bag in said lane.

## 4,024,966
## AUTOMATIC SLIDE MAGAZINE HANDLER

Paul F. Schenck, 1934 Miramonte Ave., Mountain View, Calif. 94040

Filed June 13, 1975, Ser. No. 586,551
Int. Cl.² B65G 57/00
U.S. Cl. 214—7 3 Claims



1. An arrangement for loading and unloading slide magazines having compartments for storing slides, comprising, in combination:

a slide magazine carrier plate;

a slide magazine, removably mounted on said slide magazine carrier plate;

a controlled drive for moving said slide magazine on said slide magazine carrier plate;

a magazine register guiding said slide magazine during movement on said carrier plate;

a slide assembler for stacking slides received from said slide magazine;

slide supply means for supplying different slides to said slide magazine;

said slide magazine carrier plate including an opening for transferring said slides from said compartments to said slide assembler;

said slide supply means including

a support plate,

a store for stacked slides,

a slide release, and

an opening for transferring released ones of said stacked slides from said store to said compartments of said slide magazine;

spacers connected between said slide magazine carrier plate and said support plate for providing space for moving said slide magazine between said carrier plate and said support plate;

control means connected to and coordinating operation of said slide assembler, said slide release, and said controlled drive, whereby each of said compartments successively passes said opening in said slide magazine carrier plate for transferring a stored one of said slides to said slide assembler, and said opening in said support plate for transferring a released one of said stacked slides from said store to said slide magazine; and

positioning means for placing said slide magazine in a locked position for unloading and loading of said slides, and in an unlocked position for exchanging said slide magazine.

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**4,024,967**

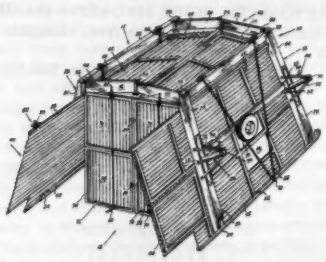
## STACK FORMER

**Melvin E. Dreier, Dumont, Iowa 50625**

**Filed May 20, 1976, Ser. No. 688,290**

**Int. Cl.² B65G 57/00**

**U.S. Cl. 214—9** **10 Claims**



1. In an apparatus of the type to receive a stream of forcibly propelled forage and to constrain the same into an accumulated mass or form at a selected location and in a predetermined configuration, a relatively massive foldable stack forming frame, comprising:

a pair of like opposed generally rectangular side frame structures having front and rear ends and having respective upper and lower sections pivotally connected so that said lower sections are capable of folding toward and away from said upper sections,

a respective top assembly including like opposed bar lengths having outer ends hingedly secured respectively to opposed front and rear ends of said upper sections and having inner ends hingedly connected together for folding movement of said bar lengths towards each other into a compact V position and away from each other to a substantially planar position,

a support bar connected between the inner end hinge points of said top assembly bar lengths,

a wheel mounted to each upper section adjacent the corresponding lower section,

a skid on the outer end of each lower section,

a respective hydraulic jack mounted to the front and rear ends of each side frame structure and operably connected to said upper and lower sections for effecting folding movement of said sections relative to each other,

a hitch means secured to the front end of said side frame structures,

said jacks being connectible to a source of hydraulic power wherein the extension of said jacks effect the closed or folded position by elevating said lower sections to a V-shaped relationship with said upper sections causing said wheels to become engaged with the ground and at the same time moving said upper sections towards each other causing the bar lengths of the top assembly to fold together at their hinge connection, and

the retraction of said jacks effecting the open or expanded position for stack forming operation by moving said lower sections outwardly and downwardly from said upper sections until said skids are in ground engagement and the angle between said sections is greater than 90° so that said wheels serve as a fulcrum as operation of the jacks moves the pivot point between the upper and lower sections over center and said upper sections rise and move away from each other causing the bar lengths on the top assembly to be elevated and opened to a transverse position between the side frame structures and wherein the wheels are elevated from ground level as the upper and lower sections become planar on an inclined plane outwardly and downwardly from their topmost point to ground level.

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**4,024,968**

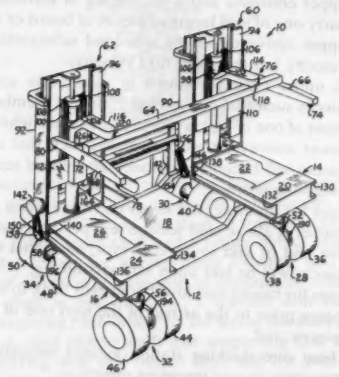
## HEAVY LIFT SIDE LOADER TRUCK

**Walter M. Shaffer, Peoria, Ill.; James R. Doyle, Salem, Oreg., and Victor V. Virostek, Mentor, Ohio, assignors to Towmotor Corporation, Mentor, Ohio**

**Filed Sept. 2, 1975, Ser. No. 609,888**

**Int. Cl.² B60P 1/54**

**U.S. Cl. 214—75 G** **34 Claims**



1. A load handling vehicle comprising a generally elongated main frame, front and rear transverse frame modules fixed to front and rear ends of said main frame, wheel assemblies mounted adjacent opposite ends of said transverse frame modules, all of said wheel assemblies being steerable, each said module comprising a stationary member and a movable member, front and rear mast assemblies mounted for transverse movement respectively on said front and rear modules,

said mast assemblies comprising respectively front and rear vertically extensible masts, load handling means mounted on said masts for picking up and depositing a load to be handled, power and control means for motivating and steering said vehicle and raising and lowering said masts, and means for telescoping said stationary member with respect to said movable member whereby the vehicle may be extended in the transverse direction, said wheel assemblies comprising first wheels being attached to said movable member, which are steerable relative to second wheels of said wheel assemblies, said second wheels being mounted on said stationary member whereby when said movable member is moved said first wheels are aligned in the direction of movement of said movable member

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**4,024,969**

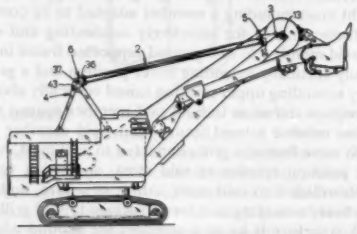
## MULTIPLE CABLE SUSPENSION ASSEMBLY

**Nils E. Hedeen, Mequon, Wis., assignor to Harnischfeger Corporation, W. Milwaukee, Wis.**

**Continuation of Ser. No. 548,296, Feb. 10, 1975, abandoned. This application Feb. 24, 1976, Ser. No. 660,851**

**Int. Cl.² E02F** *3/75*

**U.S. Cl. 214—135 R** **13 Claims**



1. A multiple cable suspension means for connection between two spaced apart structures and comprising, four suspension cables of fixed approximately equal length extending between said two spaced apart structures, each cable extending in a straight line between said two spaced apart structures and no cable being parallel with another, and compensating means for compensating for differences in the lengths of said cables and for substantially equalizing the tensile stresses applied to said cables, said compensating means including a first pair of equalizer members spaced apart and pivotably connected to one of said structures, and a second pair of equalizer members spaced apart from one another and pivotably connected to the other of said structures and in alignment with said first mentioned pair, each of said equalizer members being independently pivotable, each of said cables including opposite ends, each of said ends being connected to at least one of said equalizer members, said equalizer members connecting said cables to said structures, two of said cables being connected to one of said first pair of equalizer members and being connected to both of said second pair of equalizer members and the other two of said cables being connected to the other equalizer member of said first pair and to both of said second pair of equalizer members whereby the tension in all four of said cables between said structures is maintained equal.

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**4,024,970**

## BALE HANDLING APPARATUS

**David K. Schirer, West Bend, Wis., assignor to Gehl Company, West Bend, Wis.**

**Filed Nov. 26, 1975, Ser. No. 635,686**

**Int. Cl.² B66C** *1/44*

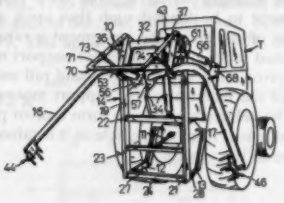
**U.S. Cl. 214—147 G** **7 Claims**

1. A bale handling apparatus for gripping bales of cut crop material, said bale handling apparatus comprising:

a frame securable to a supporting vehicle;

an arm support structure means swingably mounted on said frame and swingably movable about a horizontal, transverse axis, said arm support structure means including a shaft supported by said frame and rotatable about said horizontal transverse axes and at least one arm support member extending from said shaft and rigidly secured thereto, said member having a free end portion swingably movable in response to rotational movement of said shaft;

a pair of L-shaped bale gripping arms, each of said arms including a first elongated portion projecting away from said support means and having a free end for engaging a



bale and including a second elongated portion generally perpendicular to said first elongated portion and having an end supporting a gear means, said gripping arms each being pivotably supported by said free end portion and being pivotable about spaced apart axes which are generally normal to said horizontal transverse axis and spaced therefrom, each of said arms having bale engaging members at said free end, and said gear means of said arms being in intermeshing relationship whereby transverse movement of one of said arms causes transverse movement of the other of said arms and whereby said free ends are transversely positionable relatively toward and away from one another.

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**4,024,971**

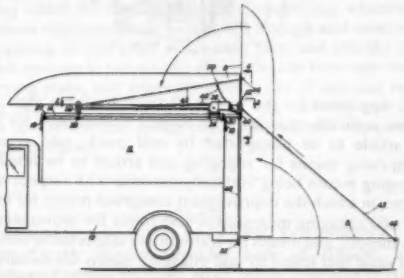
## EQUIPMENT LOADER AND UNLOADER FOR VEHICLES

**Daniel F. Rohrer, Hillsboro, Oreg., assignor to Ralph M. Eide, Lake Oswego, Oreg.**

**Continuation of Ser. No. 459,946, April 11, 1974, abandoned. This application Sept. 19, 1975, Ser. No. 614,909**

**Int. Cl.² B60R** *9/00*

**U.S. Cl. 214—450** **8 Claims**



1. An equipment loader and unloader for vehicles comprising

a. a pair of elongated side rail assemblies,

b. mounting means arranged to mount said rail assemblies on a vehicle,

c. said rail assemblies being of sufficient length to extend beyond the vehicle on which they are mounted,

d. front and rear transverse support means arranged to support equipment thereon in a loaded position and to

load and unload equipment by pivotal movement over said rear support means,

e. means attaching said front and rear support means to said side rail assemblies,

f. at least one of said support means by its attaching means being adjustable along said side rail assemblies to accommodate equipment of different lengths,

g. at least one of said transverse support means comprising a roller,

h. rotary drive means engaging said roller for rotating the latter in a winch driving function,

i. winch line means attached to said roller and having an end thereof arranged to be secured to a front portion of equipment to be loaded such that upon selected drive rotation of said roller the equipment is raised or lowered in pivoted relation over said rear support means,

j. and a pivot roller supported on said rail assemblies rearward of the rear transverse support means and also beyond the vehicle whereby to form a pivot point for spacing equipment from the vehicle as it is raised and lowered relative to the vehicle.

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**4,024,972**

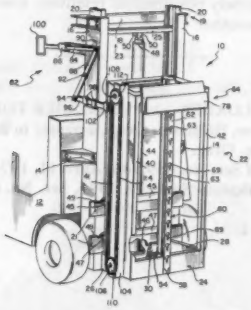
**LIFT TRUCK APPARATUS**

**Lloyd L. Hobson, 312 N. East St., Elnora, Ind. 47529**

**Filed Feb. 23, 1976, Ser. No. 660,337**

**Int. Cl.² B65G *47/00***

**U.S. Cl. 214—650 R** **2 Claims**



1. Apparatus for use with a lift truck having a mast and a frame vertically movable with respect to said mast for lifting an article to be transported by said truck, said apparatus comprising means for engaging said article to be lifted, said engaging means being vertically movable with respect to said frame, in which the improvement comprises means for mounting said engaging means upon said frame for movement relative thereto, and means for transmitting said relative motion of said mast and frame to said engaging means for causing said engaging means to move relative to said frame, said transmitting means comprising a pair of sprockets on said mounting means, a chain engaging said sprockets for causing them to rotate together, selectively actuable means for engaging a portion of the length of said chain for immobilizing said length of chain with respect to said mast for causing said sprockets to rotate when said frame is moved relative to said mast, and a gear train coupled to at least one of said sprockets, and said engaging means comprising a rack engaging a gear of said train for moving said engaging means vertically at a multiple of the rate of vertical movement of said frame with respect to said mast.

**4,024,973**

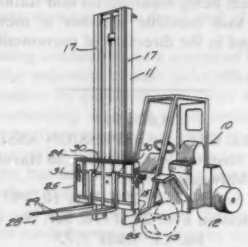
**FORKLIFT TRUCK WITH SELECTIVELY CONNECTABLE MAST**

**Robert T. Siderits, Mequon, and Reinald D. Liegel, Port Washington, both of Wis., assignors to TCI Power Products, Inc., Benson, Minn.**

**Filed Aug. 28, 1975, Ser. No. 608,456**

**Int. Cl.² B66F *9/20***

**U.S. Cl. 214—674** **4 Claims**



1. A forklift vehicle comprising a ground supported frame, an upright mast including a member adapted to be connected to said frame, means for selectively connecting and disconnecting said member to said ground supported frame in one of a generally vertically extending lower position and a generally vertically extending upper position raised vertically above said lower position and so as to hold said member against vertical movement relative to said frame when said member is connected to same frame, a grill connected to said mast, having a lowered position relative to said mast, and being vertically adjustable relative to said mast, a fork structure, and means for selectively mounting said fork structure to said grill so that said fork structure is located adjacent the ground when said grill is in said lowered position relative to said mast and said mast is mounted in either one of said lower position and said upper position.

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**4,024,974**

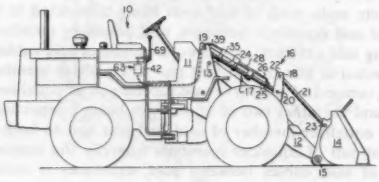
**DETENT RELEASE MEANS FOR LOADER BUCKET POSITIONERS**

**Norman J. Hodge, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed June 13, 1975, Ser. No. 586,846**

**Int. Cl.² E02F *3/85***

**U.S. Cl. 214—762** **14 Claims**



1. A construction vehicle comprising a work tool movably mounted thereon, at least one fluid-actuated cylinder operatively connected to said work tool for selectively moving said work tool on said vehicle to a work position thereon, control means comprising valve means operatively connected to said cylinder and positionable between first and second conditions of operation, detent means, including a housing movably mounted on said vehicle, a plunger having a detent thereon reciprocally mounted in said housing an spring means disposed between said housing and said plunger for normally

biasing said detent into engagement with a notch formed in a rod reciprocally mounted in said housing, operatively connected to said valve means for normally holding said valve means in said first condition of operation and release means interconnected between said housing and said cylinder for automatically moving said housing to release said detent means in response to actuation of said cylinder for permitting said valve means to return to its second condition of operation.

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4,024,975

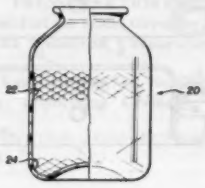
## REINFORCED BOTTLE

Albert R. Uhlig, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 505,966, Sept. 16, 1974, Pat. No. 3,956,441. This application Jan. 2, 1976, Ser. No. 646,225

Int. Cl.² B65D 1/02

U.S. Cl. 215—1 C 6 Claims




1. A container of thermosplastic material comprising a finish at one end, a peripheral wall, and a bottom wall each having a substantially smooth outer configuration, a plurality of integral, closely spaced localized reinforcing plastic ribs on the interior surface only of at least one of said walls, and intermediate wall portions between each pair of said closely spaced internal ribs, the thickness of said integral ribs being greater than the thickness of the intermediate wall portions between adjacent, closely spaced ribs, and the intermediate wall portions between each pair of said closely spaced ribs being thicker than other non-ribbed portions of the container wall.

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4,024,976

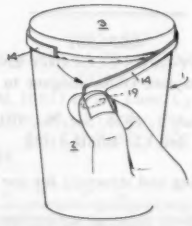
## TAMPERPROOF MOLDED PACKAGE

Daniel D. Acton, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio

Filed Oct. 30, 1975, Ser. No. 627,142

Int. Cl.² B65D 1/02, 17/00

U.S. Cl. 215—32 26 Claims




1. In a flexible plastic container having a relatively large open upper end for sealing with a press-on closure cap having a relatively shallow depending skirt, an improved tamperproofing means positioned adjacent to the open upper end and formed integrally with the container comprising:

a tamperproofing band spaced outwardly of the outer surface of the container adjacent to the open upper end of the container;

a lower portion only of said band being removably connected to the container by a frangible connecting means; and

said tamperproofing band and said connecting means defining an upwardly facing channel with a fully open top for receiving at least the lower portion of a closure cap skirt whereby said band and said connecting means bar access to the lower edge of the skirt.

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4,024,977

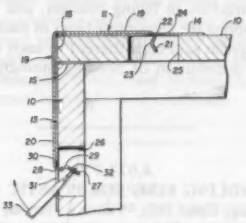
## SAFETY CLIP MEANS FOR REUSABLE SHIPPING CONTAINER

Edward C. Rowley, 1725 Hallam Drive, Lakeland, Fla. 33803

Continuation-in-part of Ser. No. 601,981, Aug. 5, 1975, Pat. No. 3,990,599. This application June 14, 1976, Ser. No. 695,817

Int. Cl.² B65D 9/12

U.S. Cl. 217—12 R 5 Claims




1. In a knock-down reusable container having panels which are separably joined substantially in right angular relationship, a pair of reinforcing plates attached to the exterior faces of said panels adjacent a corner of the container formed by the panels, the panels having clip clearance openings near and inwardly of said corner, a substantially right angular spring clips forming said corner and having arms which lie on the outer faces of said reinforcing plates, said arms having inwardly directed formed locking terminals at their free ends, the improvement comprising the provision of a relatively narrow slot in one reinforcing plate above one clearance opening and receiving one clip locking terminal, the other reinforcing plate having a relatively large opening above the other clip clearance opening and receiving the other clip locking terminal, said other clip locking terminal having an opening formed therethrough near its free end and said opening lying within the last-named clearance opening, whereby a clip release implement may be inserted through said relatively large opening of said other reinforcing plate and into the clip terminal opening to release one arm of the clip from said other reinforcing plate, said relatively narrow slot of said one reinforcing plate then coacting with the clip locking terminal therein to prevent the spring clip from suddenly separating from the container.

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4,024,978

## TANK FOR USE WITH ELECTRIC EQUIPMENT

Tadashi Kiuchi; Kiyoto Hiraishi, both of Hitachi, and Motoharu Taneda, Matsudo, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 10, 1975, Ser. No. 621,557

Claims priority, application Japan, Oct. 14, 1974, 49-117131

Int. Cl.² B65D 7/44

U.S. Cl. 220—5 A 12 Claims

1. A tank for housing electric equipment comprising at least upper and lower tank parts, the parting line between said tank parts running in the horizontal direction and being formed with interconnecting flanges at the joining edges thereof, respectively, a plurality of vertical reinforcing stays secured to

the outer surface of said upper part of said tank and having plural faces, and a plurality of vertical reinforcing stays secured to the outer surface of the lower part of said tank and having plural faces the ends of said vertical reinforcing stays on said upper and lower parts being aligned with each other in

the vertical direction in facing relation, and interconnecting means for coupling the respective faces of each of said vertical reinforcing stays at said ends thereof to each other to provide a continuous distribution of bending moments over the surfaces thereof.

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**4,024,979**

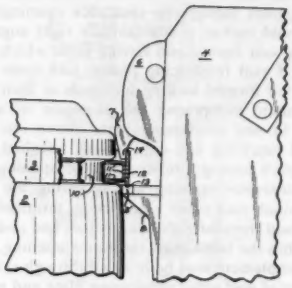
**HANDLING RING FOR PLASTIC DRUM**

**Walter J. Craig, Crest Hill; Walter K. Lewis, New Lenox, and Rondell L. Bailey, Chicago, all of Ill., assignors to Plasti-Drum Inc., Lockport, Ill.**

**Filed June 30, 1975, Ser. No. 591,505**

**Int. Cl.² B65D** *7/42, 7/02, 25/00*

**U.S. Cl. 220—71** **3 Claims**



1. A container comprising

body means having a longitudinal axis and forming a container for receiving material,

said body means including an exterior handling means disposed substantially transverse to said longitudinal axis and having at least one surface adapted to be grasped by equipment to manipulate the body means,

the exterior handler means includes a handler element having two surfaces lying in perpendicular planes to be grasped by equipment to manipulate the body means,

said handler element includes a bottom surface and upper side surface,

said upper side surface is disposed confronting said body means in spaced relation thereto,

said handler element comprises a ring lying in surrounding relationship to the body means,

the handler element is supported in support means formed on said body means,

said handler element including a support member attached to said ring and coupled to said support means to support the body means at least in a direction substantially parallel to said longitudinal axis when equipment manipulates the body means, and

said support member supporting the handler element in spaced relationship to the body means and comprising a U-shaped configuration.

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**4,024,980**

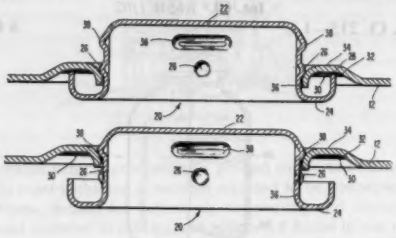
**EASY OPENING CAN END HAVING A CLOSURE PLUG**

**Raymond H. P. Kneusel, Flourtown, Pa., and Vinson S. Potts, Cherry Hill, N.J., assignors to Crown Cork & Seal Company, Inc., Philadelphia, Pa.**

**Continuation of Ser. No. 522,097, Nov. 8, 1974, abandoned. This application May 7, 1976, Ser. No. 684,403**

**Int. Cl.² B65D** *41/02*

**U.S. Cl. 220—260** **45 Claims**



1. A can of the easy-opening type comprising:

a can body;

an end panel attached to said body having a dispensing opening and a vent hole spaced from said dispensing opening, said vent hole being smaller than said dispensing opening;

a dispensing opening plug extending into said dispensing opening and sealingly engaging said end panel so as to close said dispensing opening, said dispensing opening plug being adapted to be pushed through said dispensing opening into said can body; and

a vent hole plug extending into said vent hole and sealingly engaging said end panel so as to close said vent hole, said vent hole plug being adapted to be pushed into said can body to a position of venting engagement with said end panel, said vent hole plug including first means adapted to form a seal between said panel and said vent hole plug when said vent hole plug is in said first position and second means for retaining said vent hole plug within said vent hole when said vent hole plug is in venting engagement with said end panel so as to prevent the passage of said vent hole plug through said dispensing opening.

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**4,024,981**

**EASY-OPEN ECOLOGY END**

**Omar L. Brown, Dayton, Ohio, assignor to Ermal C. Fraze, Dayton, Ohio**

**Filed July 1, 1976, Ser. No. 701,976**

**Int. Cl.² B65D** *41/32*

**U.S. Cl. 220—269** **26 Claims**

1. An easy-opening end structure for use with a container comprising

an end wall of sheet material having means for attaching said end wall to a container,

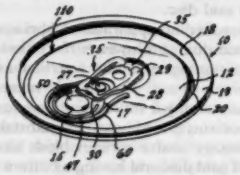
a scoreline in said end wall defining a panel which is at least partially removable to form a pour opening in said end wall,

a tab affixed to said end wall and including a lifting end and an opening end,

rivet means for attaching said tab to said end wall such that the opening end of said tab overlies said panel,

a portion of said scoreline extending between said rivet means and said opening end of said tab, score legs coop-

erating with said scoreline and extending away from said scoreline, said score legs being located laterally of said



rivet and beneath said tab to form a retaining strip which interconnects said panel to said end wall, and said tab being formed of a single sheet of material.

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**4,024,982**

## PRESSURE COOKER

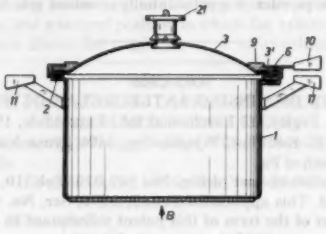
**Horst Schultz, Frankfurt am Main, Germany, assignor to AMC International Alfa Metalcraft Corporation AG, Rotkreuz, Switzerland**

**Filed Aug. 2, 1976, Ser. No. 710,392**

**Claims priority, application Germany, Aug. 4, 1975, 2534709**

**Int. Cl.² B65D** *41/06, 45/00, 45/32;* **E05B** *15/02*

**U.S. Cl. 220—293** **10 Claims**



1. Pressure cooker consisting of a pan part and a lid which can be locked thereto in pressure tight manner, the pan part having a plain circumferential outwardly bent rim and the lid being provided with a closure part rotatable concentrically thereto, the lid and closure part having on their periphery flanges each engaging under the pan edge over a maximum of half the length thereof, these flanges being constructed so as to be movable into one another and arranged so that the pan rim can be released from the flanges at least over half its circumference.

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**4,024,983**

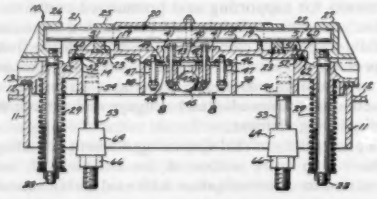
## SAFETY LOCKING COVER ASSEMBLY FOR TANK DOMES

**Herman D. Muehl, 10851 Drury Lane, Lynwood, Calif. 90262**

**Filed Dec. 22, 1975, Ser. No. 643,522**

**Int. Cl.² B65D** *45/00*

**U.S. Cl. 220—316** **5 Claims**



1. A safety locking cover assembly for mounting upon the peripheral ring defining the filling opening of a tank, said assembly comprising:

a circular base for peripheral engagement upon the upper edge of said peripheral ring and including a central opening;

a cover mounted to said base for pivotal movement about a horizontal axis, between an open position and a closed position in sealing relation over said central opening;

clamping means on said base operative to maintain said peripheral engagement between said base and said ring;

a plurality of catches on said base;

spring bias means urging said catches against said base and thereby constraining said catches against upward movement; and

locking means on said cover including elements normally engaged by said catches in said closed position of said cover to establish a locked condition preventing said pivotal movement of said cover to said open position, said cover, said locking means and said catches being upwardly movable together in said locked condition against the bias of said spring bias means upon development of a predetermined internal tank pressure against said cover, whereby said pressure is vented through said central opening while said cover, said locking means and said catches remain in said locked condition.

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**4,024,984**

## DISPENSER WITH AT LEAST ONE EJECTION OPENING FOR INDIVIDUAL EMISSION OF PARTICLES OF A UNIFORM SHAPE AND SIZE, PREDOSED AS BULK MATERIAL

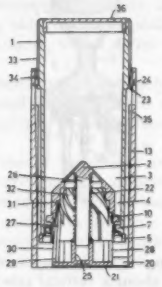
**Gábor Gyimothy, 84, Hirzenbachstrasse, 8051 Zurich, and Josef Tresch, 10, Am Pfisterholzli, 8606 Greifensee, both of Switzerland**

**Filed June 26, 1975, Ser. No. 590,734**

**Claims priority, application Switzerland, June 28, 1974, 8970/74**

**Int. Cl.² B65D** *83/04*

**U.S. Cl. 221—203** **4 Claims**



1. A dispenser for the individual release of particles predosed as bulk material and of a uniform shape and size, said dispenser comprising:

a. a first body having an open end and a closed end;

b. a second body disposed coaxially in said first body, extending from the open end thereof towards the closed end, and sized to leave an annular gap between said first and second bodies at least at the open end of said first body;

c. first means interconnecting said first and second bodies for permitting relative rotational motion and for preventing relative axial motion;

d. a casing disposed coaxially around said first body and extending from the open end thereof towards the closed end;

e. second means interconnecting said first body and said casing for permitting limited relative axial movement and for preventing relative rotational movement;
f. a central element disposed coaxially within said second body;
g. third means interconnecting said central element and said casing so that said central element moves axially with said casing;
h. fourth means carried by said central element for biasing said second body axially away from said central element, whereby said first body is moved to one extreme of its limited axial movement relative to said casing;
i. fifth means interconnecting said central element and said second body for converting axial movement of said central element into rotational movement of said second body, whereby relative axial movement of said first body and said casing causes relative rotational movement of said first body and said second body;
j. a cover closing the annular gap between said rotational bodies at the open end of said first rotational body, said cover having therein at least one ejection opening; and
k. sixth means for organizing the bulk material within the dispenser so that, with repeated operation of the dispenser, the mass of the unorganized particles move in the direction of the open end of said first rotational body and, as they approach said cover, are organized in their spatial positions so that one particle at a time is fed to said at least one ejection opening and is thus prepared for a simple mechanical ejection, said means employing only gravity and the external forces which are applied for the operation of the dispenser.

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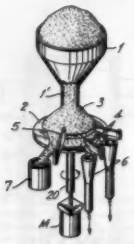
**4,024,985**

## POWDER FEEDING APPARATUS AND METHOD

**Koichi Iinoya; Hiroaki Masuda, both of Kyoto, and Kinnosuke Watanabe, Kawasaki, all of Japan, assignors to Sankyo Dengyo Co. Ltd., Japan**

**Filed Sept. 16, 1976, Ser. No. 724,107**
**Int. Cl.² B65G** *65/30*
**U.S. Cl. 222—1** **14 Claims**



1. A powder feeding method comprising the steps of rotating a horizontal disc about a vertical axis passing through the center thereof at a predetermined constant speed, maintaining on the rotating disc, substantially centrally thereof, a substantially conical body of powder which thus rotates together with the disc, situating over the disc a stationary coarse scraper which extends substantially radially with respect to the disc across the outer periphery thereof inwardly toward said axis into the conical body of powder with the coarse scraper having a bottom edge parallel to the disc and situated at a given distance therefrom so that part of the powder from the cone is removed from the disc on one side of the scraper while a layer of powder of a predetermined radial width and thickness turns with the disc beyond the bottom edge of the coarse scraper, and situating in the path of said layer a precision scraper having a bottom edge located closely adjacent to an upper surface of the disc with said precision scraper also extending substantially radially with respect to said disc across the outer peripheral edge thereof inwardly toward said axis to an extent less than said coarse scraper, so that at least part of said layer is removed from said disc by said precision scraper, whereby said precision scraper will feed powder at a substantially constant rate from said disc.

6. In a powder-feeding apparatus, a horizontal disc, means connected to said disc at a lower surface thereof for rotating said disc at a constant speed about a vertical axis which passes through the center of said disc, supply means situated over said disc for maintaining a substantially conical body of powder on an upper surface of said disc substantially centrally thereof, a stationary coarse scraper blade situated over said upper surface of said disc and having a bottom horizontal edge situated at a given distance from the upper surface of said disc, said coarse scraper blade extending substantially radially with respect to said disc across an outer peripheral edge thereof inwardly toward said axis to an extent sufficient to extend into the conical body of powder for removing part of the powder from said disc while providing beyond the bottom horizontal edge of said coarse scraper blade a layer of powder of a given thickness and radial width which turns with the disc beyond said coarse scraper blade, and at least one precision scraper blade situated directly next to the upper surface of said disc and extending radially across the outer peripheral edge thereof inwardly toward said axis to an extent less than said coarse scraper blade, with said precision scraper blade being situated downstream of said coarse scraper blade in the direction of rotation of said disc in the path of the layer of powder which travels with said disc beyond the lower edge of said coarse scraper blade, whereby said precision scraper blade will remove powder at a substantially constant rate from said disc.

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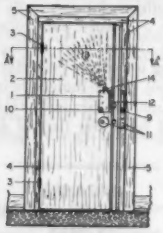
**4,024,986**

## FLUID DISPENSING ANTI-BURGLAR DEVICE

**Charles R. Fegley, 12 Larchwood Rd., Laureldale, 19603 and Werner F. Esseluhn, Wyomissing, 1606 Frusa Valley Rd., 19605, both of Pa.**

**Continuation-in-part of Ser. No. 549,020, Feb. 10, 1975, abandoned. This application Feb. 3, 1976, Ser. No. 654,861**
**The portion of the term of this patent subsequent to Aug. 12, 1992, has been disclaimed.**
**Int. Cl.² G08B** *13/08, 15/02*
**U.S. Cl. 222—5** **12 Claims**



1. A fluid dispensing anti-burglar device for use with a pressurized container, the device comprising:
a. a body member;
b. means for supporting said pressurized container in said body member, wherein said pressurized container has a fluid-dispensing element adapted to release fluid under pressure from said pressurized container when actuated;
c. an actuating member containing a dispensing element actuating means adapted to engage and actuate said fluid dispensing element;
d. a passageway in said dispensing element actuating means having an entry section at one end thereof, said entry section in communication with said fluid dispensing-element;
e. spring means biasing said actuating member slidably mounted in said body member and arranged to force said

fluid-dispensing element and said dispensing element actuating means into engagement with each other, thereby causing said fluid-dispensing element to be actuated;

f. trigger means releasably retaining said spring biased actuating member in a cocked position in which said fluid-dispensing element and said dispensing element actuating means are separated from each other, said trigger means including a trigger mounted for movement within said body member between an holding position and a release position, said trigger in said holding position being in engagement with a surface of said spring biased actuating member to retain said actuating member in a cocked position, said trigger in said release position allowing said dispensing element actuating means to actuate said dispensing element and thereby cause discharge;

g. means for locking said trigger in engagement with said actuating member, said locking means being mounted for movement within said body member between a locked position and a unlocked position, said locking means in said locked position securing said trigger in engagement with said biased actuating member, and said locking means in its release position permitting the trigger to move to its release position;

h. and means external to the body member for releasably retaining the trigger in the actuation position, said external retaining means including a latch plate mounted separate from the body member, the body member being movable between a first position in which the external retaining means retains the trigger in its actuation position, and a second position in which the external retaining means allows the trigger to move to its release position.

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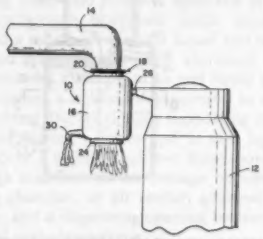
**4,024,987**

## DEVICE FOR HEATING LATHER PRODUCT FROM A PRESSURIZED CONTAINER

**James Myles, 6061 Yonge St., Apt. 709, Willowdale, Ontario, Canada**

**Filed Mar. 26, 1976, Ser. No. 670,960**
**Int. Cl.² B67D *5/62***
**U.S. Cl. 222—146 HA** **6 Claims**




1. A device for heating lather dispensed from a pressurized container and for thereby supplying hot lather, comprising in combination:

a housing defining a hot water reservoir therein and having a hot water inlet at one end thereof adapted to releasably support the housing on and operatively connect said water inlet to a water faucet, an outlet for discharging water remote from said water inlet, a lather inlet adapted to be operatively connected to the discharge outlet of a pressurized lather container and having valve means therein for preventing discharge of heated lather from within the housing, and a hot lather discharge outlet for discharging hot lather therefrom and having valve means therein for preventing leakage of hot lather therefrom below a predetermined pressure;

a coil mounted within said housing between said water inlet and said water outlet sealingly connected between said lather inlet and said lather outlet;

means for releasably and coaxially connecting the lather inlet of the device to a water faucet for the admission of purge water directly into said coil;

and a water deflector mounted within said housing above said coil for directing hot water entering said housing to said coil.

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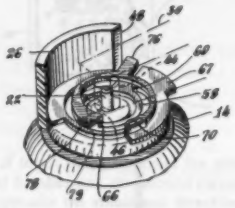
**4,024,988**

## SAFETY CLOSURE ASSEMBLY FOR AN AEROSOL CONTAINER

**Rupert M. Starrett, Stratford, Conn., assignor to The Risdon Manufacturing Company, Naugatuck, Conn.**

**Filed Oct. 28, 1975, Ser. No. 626,038**
**Int. Cl.² B65D *83/14***
**U.S. Cl. 222—153** **5 Claims**




1. A safety closure assembly for an aerosol container which is equipped with a dispensing valve and an axially, outwardly projecting valve actuating stem, said safety closure assembly comprising:

A. an overcap member mountable on the valved end of the container for substantially enclosing it and being rotatable relative thereto, said overcap member having

1. valve actuating means formed with a discharge orifice and a socket opening, for receiving the valve stem, interconnected to the discharge orifice, said actuating means being movable between an elevated position and a depressed, valve-operating position,

2. a keying element, associated with said valve actuating means for movement therewith, and

3. a depending skirt having opposing, axially extending abutment surfaces, which define an axially extending slot;

B. a blocking member non-rotatably mountable on the container, located generally below and spaced from said actuating means and keying element when in their elevated position;

C. interference means mountable on the container for movement between a valve disabling position between said keying element and said blocking member to prevent depression of said valve actuator means sufficient to operate the dispensing valve, and a valve enabling position removed from between said keying element and said blocking member;

D. means for urging said interference means to the valve disabling position;, said urging means comprising an interrupted ring mounted at one end with the container and having an opposite end cantilevered theefrom to be moved perpendicularly with respect to the container axis, said interference means being mounted at said cantilevered ring end;

E. means for moving said interference means to the valve enabling position by rotation of said overcap member relative to the container in one direction, said moving means comprising a lever fixed to said interrupted ring, projecting away therefrom into said slot, operatively associated with at least one of said abutment surfaces, whereby rotation of said overcap relative to the container laterally moves said lever, pulling said ring to move said interference means to the valve enabling position; and

F. lock-out and reset means

1. for holding said interference means in the valve enabling position prior to operation of the dispensing valve by said valve actuating means, and
2. for resetting said interference means by permiting it to return to the valve disabling position under the influence of said urging means after the dispensing valve is operated by said valve actuator means.

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**4,024,989**

## DISPENSING ATTACHMENT FOR INDICATING AMOUNT OF FLUID CONTENT REMOVED FROM A CONTAINER THEREFOR

**Frank L. Wessely, 360 W. 45th St., New York, N.Y. 10036**

**Filed Sept. 2, 1975, Ser. No. 609,716**
**Int. Cl.² B67D** *1/08*
**U.S. Cl. 222—154** **4 Claims**

1. A dispenser attachment for use with a bottle comprising, in combination, a cork-like member removably mountable in an opening in the bottle, said cork-like member having a medial passage extending axially therethrough, a pouring spout secured to the cork-like member in fluid flow communication with said passage so that the contents of the bottle may be dispensed therethrough, a vent tube mounted in the pouring spout extending from the upper end of the pouring spout down into the upper portion of said bottle, a dip stick having its upper end mounted in the passage of said cork-like member and its lower end extending adjacent the bottom of the bottle, said dip stick having its upper end slotted for receiving said vent tube, said dip stick having a plurality of surfaces and each surface having a series of numerals thereon spaced a predetermined distance apart for indicating the number of drinks of a predetermined size dispensed from said bottle, a flexible tape looped around the pouring spout adjacent the top of the cork-like member, a frangible sealing label secured to the free ends of said tape and adhered to the bottle, whereby it is readily observable when said cork-like member has been tampered with.

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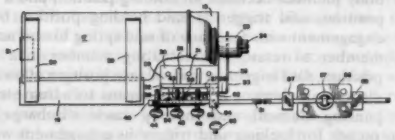
**4,024,990**

## DISPENSING APPARATUS FOR AEROSOL SPRAY CANS

**Thomas J. Smrt, 31W 300 W. Bartlett Road, Bartlett, Ill. 60103**

**Filed July 10, 1975, Ser. No. 594,623**
**Int. Cl.² B67D** *5/08*
**U.S. Cl. 222—180** **14 Claims**

1. A dispensing apparatus for intermittently releasing the contents of a valve-equipped aerosol can comprising a mounting frame, an actuator pivotally mounted on the frame and engageable with the valve of the aerosol can, the actuator being movable between a valve-closed position in which the valve of the aerosol can is closed and a valve-opened position in which the valve of the aerosol can is opened, an actuator drive member rotatably mounted on the frame and including a plurality of pins which extend parallel to the axis of rotation of the drive member, each pin being movable in said parallel direction between a first position in which it is engageable



with the actuator as the drive member rotates for pivoting the actuator from the valve-closed position to the valve-opened position and a second position in which it is not engageable with the actuator whereby only selected ones of the pins will engage the actuator during one complete rotation of the drive member, and means engageable with the drive member for intermittently rotating the drive member whereby the valve of the aerosol can is intermittently opened.

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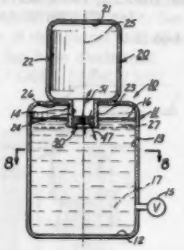
**4,024,991**

## IMPARTER TO PROVIDE SILVER TO WATER SUPPLIES

**George Noblit Tyson, 4950 N. Live Oak Canyon Road, La-Verne, Calif. 91750, and Robert Roy Austin, 2270 E. Orange Grove Blvd., Pasadena, Calif. 91104**

**Filed Nov. 28, 1975, Ser. No. 636,065**
**Int. Cl.² B67D** *3/00*
**U.S. Cl. 222—189** **14 Claims**



1. An imparter to impart silver to a water system wherein air is drawn into a receiver container when water is withdrawn from the receiver container to a storage container through an opening that, during said withdrawal, is below the water level in the receiver container, the air entering the receiver container through said opening, said imparter comprising: a body so proportioned and arranged as to fit in said opening, and having a dimension of thickness, a pair of spaced-apart end walls forming part of said body and defining said dimension of thickness and at least partially bounding a cavity in the body, there being perforations in both of said end walls to permit water to enter, to flow through, and to exit from the cavity along a discharge path, a permeable packing of silver imparting material in said cavity on said discharge path having the inherent property of transferring silver into the water as a consequence of contact therewith, and air vent means extending from end wall to end wall of the body which admits air to the receiver container along an entry path separate from the discharge path, the air vent means, and the perforations and packing, being so proportioned, disposed and arranged that air enters the receiver container via the air path in preference

to the discharge path, and water exits from the receiver container via the discharge path in preference to the entry path.

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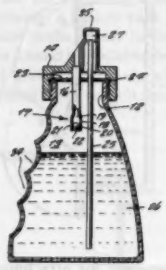
**4,024,992**

## AIR ATOMIZER BOTTLE SPRAYER WITH SCREW CAP

**Hans G. Schmid, 26 Locust Lane, Huntington, N.Y. 11743**

**Filed Nov. 24, 1975, Ser. No. 634,852**
**Int. Cl.² B05B *11/04***
**U.S. Cl. 222—211** **1 Claim**



1. An air atomizer bottle sprayer, comprising in combination a squeezable bottle having an opening through a neck at its upper end, and a hard plastic cap screw-threaded on said neck, said bottle having an interior containing liquid and a quantity of air above said liquid, said cap incorporating means for air from an atmosphere to freely enter said bottle interior when said bottle is relaxed from being squeezed, said means comprising an air intake opening fitted with a vertical valve tube having a lower portion thereof extending substantially downward into said interior, a one way valve at a lower end of said valve tube comprising a diametrically enlarged chamber containing a spherical ball vertically movable between a bottom end wall and a valve seat formed by a shoulder at an upper end of said diametrically enlarged chamber, and a side opening adjacent said bottom end, said one way valve automatically closing when said bottle is squeezed preventing an air passage therethrough from said bottle interior to said atmosphere; and a means to mix said liquid and said air from said interior and dispense the same atomized as a spray, wherein said means for mixing said air and liquid and dispensing thereof comprises a holding disc secured in a bottom of said cap, said holding disc frictionally supporting therethrough a dispensing tube having a lower end in said liquid and an upper end adjacent a mixing chamber thereabove, air bleed openings through said disc, an air passage between said disc and said mixing chamber, an air venturi adjacent said upper end of said tube, and a dispensing opening between said mixing chamber and said atmosphere.

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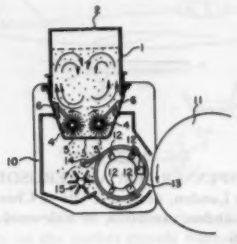
**4,024,993**

## TONER-REPLENISHING APPARATUS FOR USE IN DRY PROCESS ELECTROSTATIC COPIER

**Yoshihiro Hanada, Toyokawa, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Jan. 28, 1975, Ser. No. 544,723**
**Claims priority, application Japan, Feb. 7, 1974, 49-15749**
**Int. Cl.² G01F *11/24***
**U.S. Cl. 222—272** **1 Claim**

1. A toner replenishing apparatus for use in dry process electrostatic copier which comprises: a tank containing a quantity of dry toner and having side walls and a bottom portion provided with a plurality of toner discharging outlets, a pair of transversely spaced apart rotatable brushes formed of pluralities of bristle members and having peripheries defined by the terminal portions of said bristle members and disposed parallel to said tank bottom portion with said bristle members in contact with said outlets, means for rotating said brushes in relatively opposite directions with their confronting faces advancing upwardly, a pair of plates disposed at the upper portions of the brushes and having the outer edges thereof affixed to said tank side walls and the inner edges thereof projecting into and in grazing contact with the peripheries of said brushes, said plates sloping upwardly outwardly from their inner edges and the respective brushes so as to guide the toner upwardly along the plates upon rotation of the brushes, the rotations of the brushes in opposite directions causing dual circulatory flows of toner above the brushes with the first



circulatory flow of toner being opposite the rotational direction of one of said brushes and the second circulatory flow of the toner being opposite the rotational direction of the other brushes as said plates coact with said brushes to induce dual circulatory flow of toner, the adjacent paths of said toner circulatory flows being downward whereby to induce a vortex flow of the toner and a bridging of toner is prevented and the toner flows at a steady rate from said outlet as said brushes rotate.

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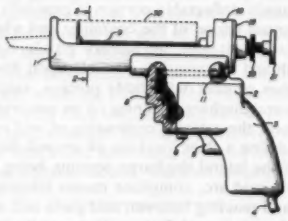
**4,024,994**

## POWER OPERATED CAULKING GUN

**George B. Davis, Jr., 7512 Marbury Road, Bethesda, Md. 20034**

**Continuation-in-part of Ser. No. 611,548, Sept. 8, 1975, which is a continuation-in-part of Ser. No. 446,961, Feb. 28, 1975, Pat. No. 3,913,799. This application Jan. 20, 1976, Ser. No. 650,627**
**The portion of the term of this patent subsequent to June 8, 1993, has been disclaimed.**
**Int. Cl.² B67D *5/46***
**U.S. Cl. 222—326** **22 Claims**



1. A hand held caulking gun including in combination, a receptacle for receiving therein a caulking cartridge having a caulk dispensing nozzle thereon, a threaded piston movable when driven through said receptacle to force the caulking from said cartridge by way of said nozzle, drive means for said piston including a tapered segmented nut disposed about the threaded surface of said piston with the larger end of said tapered nut pointing toward the caulk driving end of said piston, clamping means for clamping in driving relation the segments of said nut about the threaded surface of said piston and operative when rotated to effect rotation of said nut and

movement of said piston through said receptacle, a power source, a speed reducing drive train drivably connecting said power source when said clamping means and operative to effect rotation of said nut by operation of said power source and clutch means interposed in said drive train between said power source and nut and operative to interrupt rotation of said nut upon a predetermined movement arresting force being applied to the caulk driving end of said piston during operation of said power source.

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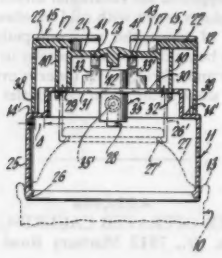
**4,024,995**

**SAFETY DISPENSER FOR AN AEROSOL DISPENSER**

**William James Landen, deceased, late of Cheshire, Conn., and Paulette S. Landen, executrix, 30 Fairwood Drive, Cheshire, Conn. 06410**

**Filed Sept. 20, 1973, Ser. No. 398,843**
**Int. Cl.² B65D *83/14***
**U.S. Cl. 222—402.11** **11 Claims**



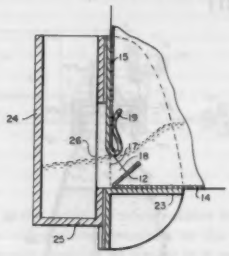
1. A safety closure and dispensing unitary assembly for application to the discharge-valve end of a cylindrical aerosol container, comprising first and second one-piece parts in mutually retained relation and having freedom for guided relative motion between first and second positions, one of said parts having container-end engaging and locking formations such that when locked to a container end the guided relative motion of said parts is in a plane generally transverse to the container axis, the other of said parts having an axially downwardly manually deflectable portion in generally axial registry over the central region of the container and when assembled to an aerosol container, an aerosol nozzle body integrally formed with and downwardly movable upon downward manual deflection of said deflectable portion, said nozzle body having a lateral discharge opening on an axis transverse to the container axis, the external contouring of said one part being such as to define a clear local arc of aerosol dischargeability, said axis of the lateral discharge opening being centrally disposed within said arc, compliant means integral with one of said parts and reacting between said parts and normally positioning said parts in said first position, axially interfering formations on and integrally formed with said parts preventing axial deflection of said deflectable portion when said parts are in said first position and being free of axial interference when said parts are in said second position, whereby said unitary assembly may be assembled to a charge aerosol container upon coaxial registry of said nozzle body with the valve neck of the container and without need for particular angular orientation, the thus-equipped container being then in readiness for valve-depressed use upon first sufficiently relatively moving said parts against the action of said compliant means and from said first position to the extent of removing said interfering formations from axially interfering relation.

**4,024,996**

**METERING DISPENSER FOR PACKAGE FLUENT PRODUCTS**

**Charles Arthur Dalke, 1151 Lansdale Court, San Jose, Calif. 95120**

**Filed Apr. 9, 1976, Ser. No. 675,463**
**Int. Cl.² G01F *11/28***
**U.S. Cl. 222—437** **1 Claim**



1. A metering dispenser for attachment on a package for fluent products wherein the package includes a flap which can be opened to form an opening in a side panel near the top edge thereof for pouring the product from the package by tipping the package over, said dispenser attachment comprising, in combination:

a backing member adapted to fit against the outside surface of the package adjacent said opening, said backing member having an opening therein;

a clip fixed to the backing member and positioned to extend into said package opening for holding the backing member in position on the package with the backing member opening in alignment with the package opening;

a dispensing container having side walls and an end wall with one side wall including an elongated opening therethrough;

means for fixing the dispensing container to the backing member with the container side wall opening aligned with the package and backing member openings and with the container in the inverted position when the backing member is placed in position on the upright package, said means for fixing including a guide extending along the backing member and a panel attached to the container side wall for movement of the container relative to the backing member to vary the distance between the backing member opening and the container end wall thereby to vary the amount of fluent product flowing into the container; and

means for sealing around the package opening including a plurality of wall members fixed to the backing member adjacent said backing member opening and positioned to project into the package opening and hold the flap open whereby by inverting the package, fluent material will be caused to flow through the opening and into the container to a level roughly corresponding to the top edge of the package opening such that a measured portion of such fluent material can be poured from the container as the package is returned to the upright position.

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**4,024,997**

**GUN CASE INCLUDING MEANS FOR SUSPENDING THE GUN CASE FROM A SUPPORT**

**Ronald N. Kolpin, Berlin, Wis., assignor to Kolpin Manufacturing, Inc., Berlin, Wis.**

**Filed June 4, 1975, Ser. No. 583,639**
**Int. Cl.² F41B *13/04***
**U.S. Cl. 224—2 R** **15 Claims**

1. A gun case comprising: a hollow case body having a muzzle end and a butt end for receiving a gun therein, an identification card holder secured to said butt end and a pair

of openable loops for removably suspending said gun case from a shaft, said openable loops extending from said card holder and each including a detachable connection for opening and closing said openable loops, whereby said openable loops, when closed, can be removably attached to opposite ends of said shaft and embrace said shaft and, when open, can be removed from said shaft, whereby said gun case may be removably and vertically suspended from said shaft and in generally coplanar relationship with a vertical plane including said shaft.

10. A handgun case for receiving a handgun therein, said handgun case comprising: a hollow case body defined by two generally flexible side walls, each having peripheral edges, said peripheral edges joined by slidable fastening means, a belt loop secured to said hollow case body whereby said handgun case may be suspended from a belt, said slidable fastening

means including a pair of independently openable closing members for opening and closing said hollow case body and adapted to permit access to a handgun therein when said case is suspended from a belt, a resilient bumper member secured to one end of said case and adapted to have the muzzle of a handgun received in said case abut against said bumper when said case is suspended from said belt, and loop secured to said hollow case body, said loop means including a detachable connection for opening and closing said loop means whereby said loop means, when closed, can embrace a support and, when open, can be removed from said support whereby said gun case may be removably suspended from said support, said support comprising a hanger including a rigid open hook and a generally horizontally disposed rigid shaft integrally attached to said hook and said loop means including a pair of openable loops detachably securable around said shaft.

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**4,024,998**

**ROCKET**

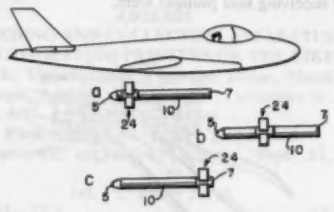
**Jacob Rabinow, Washington, D.C., and William Hunter A. Boyd, Kensington, Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Mar. 7, 1956, Ser. No. 570,190**

**Int. Cl.² F42B** *15/10*

**U.S. Cl. 244—3.26** **1 Claim**

1. A slidable fin assembly in combination with a rocket adapted to be launched motor-first with respect to the air, said rocket having a motor at one end and a warhead at the other end, said fin assembly comprising a tube encircling the body of said rocket and adapted to be longitudinally slidable thereon, a plurality of fins symmetrically mounted to said tube, each of said fins having an airfoil cross section which is asymmetric about its chord so that the lift of said fins acts to spin the rocket in the same direction about its longitudinal axis whether the rocket is traveling motor-first with respect to the air or warhead-first with respect to the air, said slidable fin assembly being initially located at the warhead end of the rocket so that said fins provide stabilization as the rocket initially travels motor-first with respect to the air, air-responsive lock means adapted to cooperate with said fin assembly and said rocket so that said lock means holds said fin assembly at the warhead end of the rocket while the rocket travels motor-first with respect to the air and unlocks said fin assembly when the thrust of the rocket motor causes the rocket to stop and reverse directions, said fin assembly in response to the aerodynamic forces on said fins thereupon longitudinally




sliding to the motor end of the rocket so that the fins now provide stability as the rocket travels warhead-first with respect to the air, and means on said rocket for engaging and maintaining the fin assembly in position at the motor end after sliding thereto, the spin of the rocket caused by the lift of the fins providing stability for both directions of travel of the rocket and also during the period when the rocket is not in motion.

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**4,024,999**

**ANKLET TACK BELT**

**Otis D. Latham, Pueblo, Colo., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed Nov. 3, 1975, Ser. No. 628,041**

**Int. Cl.² A45C** *11/00*

**U.S. Cl. 224—5 R** **2 Claims**

1. A belt adaptable for fastening about an ankle of a wearer, said belt is formed of an individual section of flat material comprising an intermediate section joined at each end by a relatively narrower end section, said immediate section rolled to form a cylindrical wall bounding an interior recess,

each said flat end section fitted with detachable fastener means for joining both end sections together,

said intermediate section formed with a plurality of holes that extend through the wall of the intermediate section into the interior recess bounded by the intermediate section, said holes located so as to lie along the top plane of the belt, when the flat end sections are fastened about an ankle, with each said hole of a size to fit about a surveyor's tack mounted through said hole, the shank and point of which said tack being enclosed in the interior of said intermediate section, when so mounted.

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**4,025,000**

**SPRAY NOZZLE**

**William Blasnik, Demarest, N.J., assignor to Lafayette Brass Company Inc., New York, N.Y.**

**Filed Feb. 19, 1976, Ser. No. 659,502**

**Int. Cl.² B05B** *1/32*

**U.S. Cl. 239—459** **10 Claims**

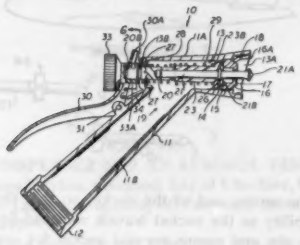
1. A spray nozzle comprising:

a nozzle body,

said nozzle body having a front opening and a rear opening,

an orifice plate having a discharge orifice disposed in said front opening,

a valving means for valving said discharge orifice,
said valving means including a plunger body having an extended end portion projecting through said rear opening,
a plunger stem connected to said plunger body,
said plunger stem having a lateral projection intermediate the ends thereof,
a guide member,
said guide member having a bore extending therethrough for receiving said plunger stem,



said guide member being disposed between said lateral projection and said plunger body,
and said guide member being formed of a plastic material,
said guide member having shaft portion and an enlarged connected head portion,
said head portion having projecting fins disposed in relative sliding relationship to the internal bore of said nozzle body,
a spring disposed about said plunger stem,
and means for actuating said valving means.

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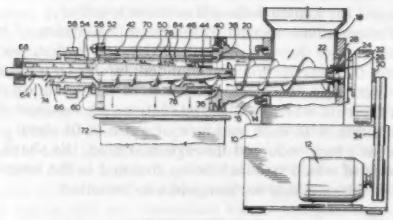
**4,025,001**

## PROCESS AND APPARATUS FOR THE MECHANICAL SEPARATION OF A COMBINATION OF MEATS AND BONE

**Joseph Yarem, Puslinch, and Werner Poss, Oakville, both of Canada, assignors to Chemetron Corporation, Chicago, Ill.**

**Filed Dec. 1, 1975, Ser. No. 636,424**
**Claims priority, application Canada, Nov. 28, 1975, 240747**
**Int. Cl.² B02C** *23/08*
**U.S. Cl. 241—24** **8 Claims**



1. A process for the mechanical separation of meat and bone into separate fractions thereof comprising the steps of:
a. providing a cylindrical conduit having an inlet end and an outlet end and containing a feed screw having a plurality of successive flights and rotatable about a longidinal axis, at least part of the wall of the conduit surrounding the feed screw comprising a separator screen for separating the meat and bone fractions,
b. introducing the meat and bone combination to be separated into the feed end of the conduit,
c. operating the feed screw to move the combination through the conduit from the inlet end to the outlet end under pressure which is operative radially outwardly against the separator screen so as to force the meat fraction through the separator screen while the bone fraction is retained thereby and moved through the conduit to the outlet end,
d. discharging the bone fraction from the outlet end and the meat fraction from the separator screen,
the process being characterized by:
e. the operation of the feed screw effects a movement of the combination between each immediately successive pair of lands comprising a leading land and a trailing land, which movement is radially outward adjacent the leading land, radially inward adjacent the trailing land, and from the trailing land to the leading land adjacent the screw body to apply the said radially outwardly operative pressure to the combination while minimizing shear of the mixture along the separator screen.

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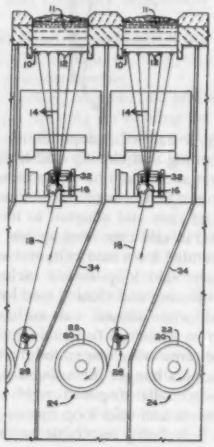
**4,025,002**

## SPIRAL FOR TRAVERSING STRAND MATERIAL

**John C. Sutton, III, State College, Pa., and Jerry J. Summerlin, Highpoint, N.C., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Apr. 21, 1976, Ser. No. 678,853**
**Int. Cl.² B65H** *54/28*
**U.S. Cl. 242—18 G** **10 Claims**



1. A spiral for traversing strand material being wound on a surface, said spiral having three wings, the first and second wings cooperating to traverse strand across said spiral as said spiral is rotated in a given direction, the third wing cooperating with said first and second wings so that upon reversing the direction of rotation of the spiral said third wing locates strand in a position to wind strand on an edge of a surface on which said strand is being wound and a guide on said spiral connected to said third wing to hold said strand in said position during said winding on said edge.

6. In an apparatus comprising a bushing having a plurality of bushing tips through which glass filaments are attenuated, an applicator for applying an aqueous binder and/or size to said filaments, a gathering shoe for gathering said filaments into a unified strand, a spiral for traversing said strand across the face of a rotating collet, reversible rotating means for rotating said spiral, and a means for collecting said wound strand into a forming package on said collet the improvement wherein said spiral has three wings, the first and second wings of which traverse said strand across said spiral as said spiral is rotated and the third wing of which locates said strand in a position to wind said strand on an edge of said colleting means upon

reversing the direction of rotation of said spiral, and a guide means on said spiral to hold said strand in said position during said winding on said edge.

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**4,025,003**

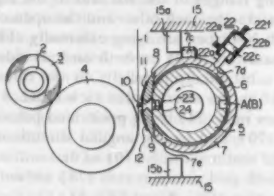
## DEVICE FOR SIMULTANEOUSLY TRAVERSING THREAD GUIDES OF A WINDING APPARATUS FOR TAKING UP A PLURALITY OF THREADS

**Yoshikazu Kawauchi, and Hiroshi Honda, both of Takahama, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya, Japan**

**Continuation of Ser. No. 552,299, Feb. 24, 1975, abandoned. This application Dec. 22, 1975, Ser. No. 643,279**

**Int. Cl.² B65H** *54/28*

**U.S. Cl. 242—43 R** **6 Claims**



1. In a winding apparatus for taking up a thread, provided with a friction roller for rotating a bobbin or thread package formed on said bobbin and a traverse device provided with a cylindrical traverse cam rotatably disposed at a position adjacent to said friction roller in axially parallel condition, said traverse cam provided with an endless helical guide groove formed on a cylindrical surface thereof, and a cam box holding said traverse cam therein and provided with a horizontal aperture formed at a part thereof in parallel condition to a longitudinal axis of said traverse cam, a pair of thread guide rails secured to edge portions of said horizontal aperture of said cam box in parallel condition to said aperture, a thread guide slidably disposed in a horizontal space formed between said guide rails in slidable engaging condition with said endless helical guide groove; an improved traverse device comprising means for supporting said cam box in turnable condition about said longitudinal axis of said traverse cam, means for alternatively locking said cam box at a normal working position where said guide rails face said friction roller or at a predetermined position where said guide rails are held at a position opposite said friction roller with respect to said longitudinal axis of said traverse cam.

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**4,025,004**

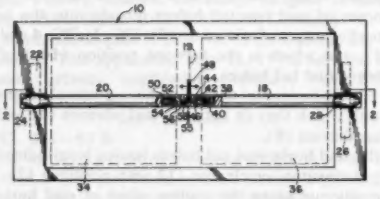
## TOILET TISSUE ROLL HOLDER

**Earl Massey, St. Petersburg, Fla., assignor to Lawrence Peska Associates, Inc., New York, N.Y.**

**Filed Sept. 27, 1976, Ser. No. 727,373**

**Int. Cl.² A47K** *10/22*

**U.S. Cl. 242—55.3** **5 Claims**



1. A holder for a pair of toilet tissue rolls comprising a frame having a pair of opposed side walls, said side walls being connected by a back wall, a mandrel mounted in said frame for rollingly dispensing toilet tissue from a pair of toilet tissue rolls, said mandrel being divided at a plane at an angle to the axis of said mandrel into two sections, each of a length to mount a toilet tissue roll, connecting means for releasably joining said sections at said plane, the ends of said mandrel opposite said plane being pivotally secured to said end wall through pivot means extending from said end walls to the ends of said mandrel.

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**4,025,005**

## WEB FEEDING AND COLLECTING APPARATUS FOR PHOTOGRAPHIC PRINTERS OR THE LIKE

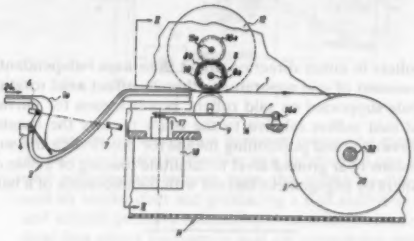
**Adolf Fleck, Unterhaching; Christian Götze, Munich, and Erich Nagel, Anzing, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany**

**Filed Aug. 29, 1975, Ser. No. 609,053**

**Claims priority, application Germany, Sept. 21, 1974, 2445259**

**Int. Cl.² B65H** *23/10*

**U.S. Cl. 242—75.2** **15 Claims**



1. Apparatus for advancing and collecting an elongated web which is being withdrawn from a supply device and is being collected stepwise by an intermittently driven rotary takeup device, comprising advancing means for drawing the web off said supply device and for feeding the withdrawn portions of the web toward said takeup device; drive means for rotating said takeup device, in a direction to collect the web; first and second control means actuatable to respectively start and stop said drive means whereby said takeup device continues to rotate in said direction by inertia subsequent to stoppage of said drive means until and after the convoluted web is tightly packed therearound; and means for decelerating the web intermediate said advancing means and said takeup device, including a first roller at one side of the web between said advancing means and said takeup device, a second roller at the other side of the web between said advancing means and said takeup device, means for biasing said second roller against the web opposite said first roller responsive to actuation of said second control means and with a force which suffices to effect rotation of said rollers when said drive means is stopped but said takeup device continues to rotate in said direction after the convoluted web is tightly packed therearound, and a brake having means for yieldably opposing rotation of at least one of said rollers by said web to thereby progressively decelerate the rotation of said takeup device to zero speed.

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**4,025,006**

## APPARATUS FOR DISPENSING HAY FROM LARGE ROUND BALES

**Carrol E. Turnbow, Box 4000, Merritt, B. C., Canada**

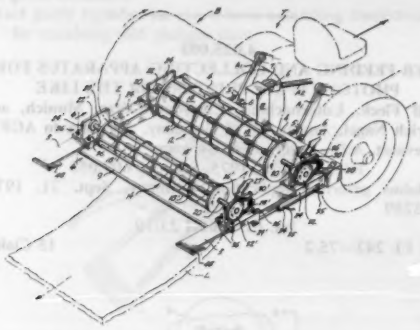
**Filed June 5, 1974, Ser. No. 476,658**

**Int. Cl.² B65H** *17/12, 75/42*

**U.S. Cl. 242—86.5 R** **3 Claims**

1. A portable apparatus for dispensing hay from a cylindrical bale formed of layers of hay wound about a central axis comprising: first and second generally cylindrical, horizontal

rollers, said rollers being substantially parallel to one another, rotatable about their cylindrical axes and so positioned relative to one another that a bale is supportable thereon with the cylindrical axis of the bale generally parallel to the axes of the rollers; support means for supporting said rollers above ground level; reversible motor means for selectively rotating



said rollers in either direction about their axes independently of movement of said apparatus to thereby effect axial rotation of a bale supported on said rollers; power means for moving one of said rollers relative to the other to vary the spacing therebetween, and positioning means for positioning the support means near ground level to facilitate loading of a bale on the rollers by engagement thereof with the underside of a bale.

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**4,025,007**

## SHIFTING HORIZONTAL TAIL WITH HELICAL MOTIONS

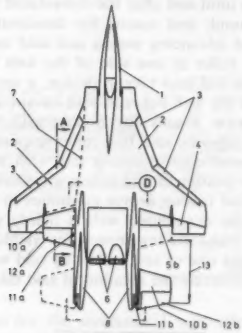
**Herbert Kaniut, Orrerweg 33/35, 5000 Cologne 71, Germany**

**Continuation-in-part of Ser. No. 508,319, Dec. 4, 1974, abandoned. This application Mar. 17, 1976, Ser. No. 669,374**

**Claims priority, application Germany, Aug. 16, 1974, 2439479**

**Int. Cl.² B64C** *5/10*

**U.S. Cl. 244—15** **9 Claims**



1. In a supersonic aircraft with a bulky propulsion system having a shifting horizontal tail which is movable in longitudinal direction of the aircraft and which for low-speed flight and particularly for takeoff and landing is moved to a rearward position but which the high-speed flight is moved to a forward position (FIG. 1; FIG. 2; FIG. 3 and FIG. 4) the improvement comprising:

fixed wings (2) having upper thickenings (20) at the middle portions of the trailing edges of the wings, and being equipped with slats (3), ailerons (4), landing flaps (5),

a fuselage (1) positioned substantially on the bottom sides of said wings,

(a) the said fuselage having two lateral engine intake tunnels (7),

two rear wing-cantilevers (8) protruding from said wings rearwards,

(a) the said two cantilevers (8) being the external and rear extensions of said two engine intake tunnels (7),

(b) external side walls of said cantilevers embodying slits (18), upper main rails (70), and lower auxiliary rails (71) (FIG. 2; FIG. 8; FIG. 9 and FIG. 11) for the rearward and forward motion of the horizontal tail,

c. said main rails (70) having a Y-shaped cross-section with a bottom fastening flange (FIG. 11), said Y-shape being turned about 90° into the horizontal plane and positioned mirror inverted on both aircraft sides so that said fastening flanges of the left and of the right rails (70) are directed to each other and the open channels of said both Y-shapes are lying externally (FIG. 11), and said main rails (70) on both aircraft sides being positioned substantially parallelly to the direction of flight, if seen in the aircraft plan view (FIG. 8),

d. said auxiliary rails (71) being positioned below of said main rails (70), and having angular directions to the directions of said main rails (70) so that in the aircraft plan view both said auxiliary rails (71) are converging towards the rear (FIG. 8 and FIG. 11),

e. each said cantilever carrying a fixed vertical tail (9) on its aft end,

f. the undercarriage (19) being retracted into said two cantilevers,

g. the jet engines (6) being positioned between said two cantilevers,

a horizontal tail (10 with positions 10*a*; 10*b*) consisting of two horizontal tail halves,

a. each half of said horizontal tail being fastened to a chassis (11 with positions 11*a*; 11*b*) of a longitudinal and airflow suitable shape,

b. each half of said horizontal tail forming together with said chassis an angular monocoque construction,

c. each said chassis (11) having two upper main trolleys (72) with rollers (73) engaging said upper main rail (70) and one lower auxiliary trolley (76) with rollers (77) engaging said lower auxiliary rail (71) (FIG. 9 and FIG. 11),

d. the said two horizontal tail halves and two chassis being for low-speed flight rolled rearwards with simultaneous and mirror inverted helical motions of both said horizontal tail halves resulting in downward motions of both horizontal tail tips, and forming in the rearward position (10b) a two-piece tail acting as the horizontal tail and having an inverted V-shape (FIG. 3 and FIG. 11),

e. the said two tail halves and two chassis being for high-speed flight rolled forwards with simultaneous and mirror inverted helical motions of both said tail halves resulting in upward motions of both tail tips, until the planes of both said tail halves substantially horizontally adjust to the planes of said wings (2) and the profile noses of said two tail halves intrude into the hollow trailing edges of said wings (2)(FIG. 3; FIG. 4 and FIG. 5), and which is the forward position (10*a*) of said horizontal tail halves,

f. the said horizontal tail halves having lateral dimensions with which they fit between said ailerons (4) and said cantilevers (8),

g. the said horizontal tail halves having longitudinal control elevators or elevons (12 with positions 12*a*; 12*b*) positioned along the trailing edges of said horizontal tail halves,

h. the said horizontal tail halves in their forward high-speed flight positions (10*a*) being placed near the upper sides of said hollow wing trailing edges (FIG. 4 and FIG. 5) which is accomplished by said upper wing

thickenings (20), whereas the not engaged landing flaps (5*a*) are placed near the bottom sides of said hollow wing trailing edges and said landing flaps are lying flat below said horizontal tail halves with the trailing edge of said landing flaps positioned in front of the leading edges of said elevators or elevons, and said slats (3), said wings (2) with said upper wing thickenings (20), said horizontal tail halves (10*a*) with said elevators or elevons (12*a*), said landing flaps (5*a*), and auxiliary flaps (21) are together forming a compact supersonic air foil profile without any lateral groove and with a minimum of air impact wave resistance (FIG. 4),

i. the said both chassis (11) being joined in airflow suitable manners to said external side walls of said cantilevers (8) particularly during high-speed flight (11*a*)(FIG. 1; FIG. 2 and FIG. 8),

j. each said horizontal tail half (10) and chassis (11) being moved rearwards and forwards by means of an endless flexible drive means, preferably by a toothed-belt (50)(FIG. 8 and FIG. 9),

k. each said elevator or elevon (12) being controlled during said rearward and forward motions of said horizontal tail half as well as in the end positions of said motions (12*a* and 12*b*) by means of a second endless flexible drive means, preferably by a second toothed-belt (51), having smaller cross-section dimensions than said endless flexible drive means (50), and lying side by side with said endless flexible drive means (50)(FIG. 8; FIG. 9 and FIG. 11),

l. both said endless flexible drive means (50; 51) on each aircraft side being positioned inside of said cantilever (8) and forming loops therein, being driven by forward sprockets (52; 53), being tensioned by rear idlers (54) having inclined idler axes to correspond with said angular direction of said auxiliary rail (71), being held in position by support rollers (55), and having said main rail (70) positioned inside of said endless flexible drive means loops, whereas said auxiliary rail (71) is positioned below and outside of said endless flexible drive means loops (FIG. 9 and FIG. 11),

m. said driving sprockets (52) for said rearward and forward motions of said horizontal tail halves on both aircraft sides being fastened to a common inner shaft (63) which is driven by a motor (46), controlled by the pilot (FIG. 8 and FIG. 10),

n. said driving sprockets (53) for said elevator or elevon control on both aircraft sides being fastened to two hollow shafts (64) — one said hollow shaft for each aircraft side — which are positioned coaxially with said shaft (63), and which are driven by a gear-box (45) receiving the longitudinal control commands (65) and lateral control commands (66) via a set of angular levers (43; 44) from the pilot or auto-pilot.

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**4,025,008**

## INTAKE CONTROL FOR AIR UTILIZING AIRCRAFT ENGINES

**Jürgen Peikert, Munich, Germany, assignor to Messerschmitt-Bolkow-Blohm GmbH, Munich, Germany**

**Continuation-in-part of Ser. No. 526,005, Nov. 21, 1974, abandoned. This application May 11, 1976, Ser. No. 685,342**

**Claims priority, application Germany, Nov. 27, 1975, 2358926**

**Int. Cl.[2] B64D** *33/02*

**U.S. Cl. 244—53 B** **6 Claims**

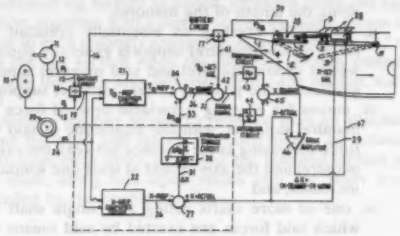
1. An air intake control for an air intake in an air utilizing engine in a high-powdered aircraft having supersonic flight capability, said air intake control comprising:

means defining an air intake duct, said air intake duct being free of bypass passageway means for controlling the position of the shock waves ahead of said air intake duct means, movable ramp means mounted in said air intake duct means and being movable across said air intake duct means for controlling the amount of air passing therethrough, a movement of said ramp means toward a closing of said air intake duct means effecting a greater spillage of air around the outside of said air intake duct means;

drive means for moving said ramp means to selectable positions across said air intake duct means;

first signal producing means for producing a first signal indicative of the actual position of said movable ramp means;

control means for producing a variable second signal indicative of the aircraft's demand for a specific position of said ramp means across said air intake duct means, said con-



trol means including first pressure measuring means for measuring the static pressure at a location on one side of said ramp means remote from the intake opening into said air intake duct and producing a first electrical signal and second pressure measuring means for measuring the total free steam pressure in said air passageway and producing a second electrical signal, said control means being responsive to a ratio of said first electrical signal to said second electrical signal in producing said variable second signal; and

comparator means for comparing said first signal with said variable second signal to effect an energization of said drive means to move said ramp means toward the aircraft's demanded position thereof.

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**4,025,009**

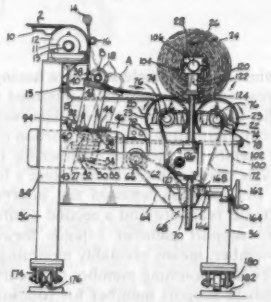
## BLANKET OR SHEET WINDING APPARATUS

**Carlo Fineo, Denver, Colo., assignor to Johns-Manville Corporation, Denver, Colo.**

**Filed Jan. 20, 1975, Ser. No. 542,475**

**Int. Cl.[2] B65H** *17/12, 25/22*

**U.S. Cl. 242—66** **13 Claims**



1. Apparatus for winding one or more strips of continuous sheet or blanket material into one or more rolls, the width of each of said rolls being essentially the same as the width of the strip contained in said roll, the apparatus comprising:

a. a rotatable mandrel about which one or more strips are wound to form one or more rolls;

b. a drive means for rotating said one or more rolls about the axis of said mandrel, said drive means comprising at least one rotatable winding roller in contact with the outer surface of said one or more rolls;

c. means for supporting said one or more rolls in such a manner that said one or more rolls is pressed against said at least one rotatable winding roller with a desired force regardless of the size or weight of the one or more rolls, said supporting means comprising:

i. mandrel supports located to be near each end of the mandrel, said mandrel supports being movable simultaneously vertically upward in response to an upward force exceeding a desired magnitude applied anywhere along the length of the mandrel;

ii. means for exerting an essentially constant upward force on said mandrel supports generally equal to the weight of said mandrel and said mandrel supports regardless of the position of said mandrel supports;

iii. means for exerting a variable upward force on said mandrel supports, with the magnitude of said variable force increasing as the distance between the axis of said mandrel and the axis of said at least one winding roller increases; and

iv. one or more shafts acting as a single shaft through which said forces are exerted by said means (ii) and (iii),

said means (ii) and (iii) being located below a horizontal plane substantially near the axis of said mandrel when said one or more rolls are being wound.

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**4,025,010**

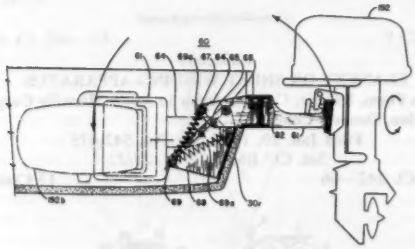
## RETRACTABLE MOTOR MOUNT

**Olaf Soot, 9 Tomahawk Lane, Greenwich, Conn. 06830**

**Division of Ser. No. 481,656, June 21, 1974, Pat. No. 3,972,544, which is a continuation-in-part of Ser. No. 394,199, Sept. 4, 1973, abandoned, which is a continuation-in-part of Ser. No. 379,234, July 16, 1973, abandoned. This application May 3, 1976, Ser. No. 682,530**

**Int. Cl.[2] B63B** *17/00*; **B63H** *21/26*; **F16M** *1/02*

**U.S. Cl. 248—4** **7 Claims**



1. In combination, a vehicle structure having a longitudinal axis and a rear end, a base member mounted to the structure adjacent the rear end, an intermediate support member, means pivotably mounting a forward portion of the intermediate support member to the base member for rotation about a horizontal axis transverse to the structure's longitudinal axis between a first position wherein the intermediate support member extends rearward and a second position wherein the intermediate support member extends forward, an engine mounting member, means pivotably mounting a forward portion of the engine mounting member to a rearward portion of the intermediate support member for rotation of the engine mounting member about a horizontal axis parallel to the structure's longitudinal axis over substantially 90°, an engine, means for mounting the engine to a rearward portion of the engine mounting member, and engine weight counterbalancing means connected between the intermediate support member and the base member and providing a force to substantially counterbalance the engine weight during pivoting of the intermediate support member and attached engine mounting means and engine, said intermediate support member and engine mounting means forming a cantilever support for the engine and with the engine outboard and spaced from the structure's rear end when the intermediate support member is in its first position.

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**4,025,011**

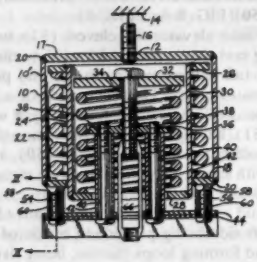
## SPRING HANGER ASSEMBLY

**John W. Rapps, 1683 Westervelt Ave., Baldwin, N.Y. 11510**

**Filed Sept. 12, 1975, Ser. No. 612,720**

**Int. Cl.[2] F16L** *3/00*

**U.S. Cl. 248—54 R** **6 Claims**

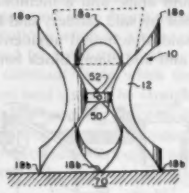


1. A spring hanger assembly for suspending pipelines comprising spring carrying means attachable to a supporting structure, a first sprung member carried by said spring carrying means, a second sprung member carried by said first sprung member, and locking means for releasably securing said second sprung member and said spring carrying means against movement relative to one another and thereby securing said first sprung member against movement relative to said spring carrying means and said second sprung member, and wherein said spring carrying means comprises an outer casing having at one end thereof means for attaching said outer casing to the supporting structure, and having at the other end thereof an inwardly extending flange, an outer compression spring supported by said inwardly extending flange, and an inner compression spring disposed within and coaxial with said outer compression spring, said first sprung member comprising an inner casing having at one end thereof an outwardly extending flange bearing on said outer compression spring at the other end of said outer compression spring, said inner casing having at the other end thereof an inwardly extending flange supporting said inner compression spring at one end of said inner compression spring, and said second sprung member comprising a pipeline suspension assembly disposed coaxially within said inner casing and having means bearing on said inner compression spring at the other end of said inner compression spring, said locking means releasably securing said pipeline suspension assembly and said outer casing against movement relative to one another, said inner and outer spring and said inner casing being thereby also releasably secured against movement relative to one another and to said pipeline suspension assembly and said outer casing and wherein said pipeline suspension assembly comprises a first plate member bearing on said inner compression spring at said other end of said inner compression spring, a rodshaped member extending from said first plate member coaxial to and within said inner compression spring, a second plate member secured to said rodshaped member and spaced from said first plate member, said second plate member having an area greater than that of the opening of said inwardly extending flange of said inner casing.

## 4,025,012
## MODULAR DECORATIVE STRUCTURE

David M. F. Chan, 1405 Arch St., and Michael L. F. Chan, 1407 Arch St., both of, Berkeley, Calif. 94708

Filed July 11, 1975, Ser. No. 595,211
Int. Cl.² F16M *11/32*
U.S. Cl. 248—163 6 Claims

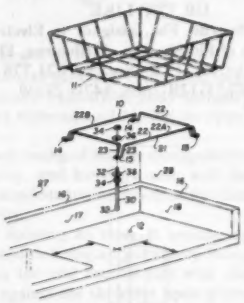


1. A structure comprising
a modular support element comprising a generally rectangular sheet of stiff deformable material having
means defining a generally circular opening in said sheet said opening having a diameter greater than one-half the width of said sheet
said sheet being deformed into a generally cylindrical shape with two diametrically opposed corners of said sheet connected to each other,
a base disposed under said modular support element,
means for holding an object disposed on said modular support element, and
means connecting said base and said means for holding an object to said support element.

## 4,025,013
## SPACE SAVER DISH DRAINER SUPPORT

Muthuvaramadam K. Anantharaman, Flushing, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed May 12, 1976, Ser. No. 685,710
Int. Cl.² A47F *7/00*; A47C *21/00*
U.S. Cl. 248—163 2 Claims

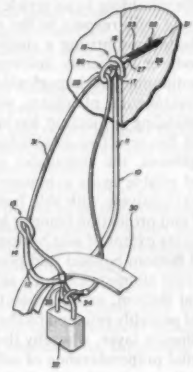


1. A support platform for a kitchen rack which provides working space under said platform, in use, comprising
a wire frame formed as a rim of four border members in substantially rectangular configuration joined to four support legs, said legs shaped to rest on the top edge of an upraised flange that bounds the surface of a kitchen counter, and said rim generally extending in a common plane, together with
an extension leg adaptable for detachable fastening to one of said frame legs so that the three remaining frame legs may rest directly on the top edge of corner flanges of a kitchen counter where each such flanges abuts a vertical wall, with the said extension leg resting on a lower level of the surface of the counter, when fastened to the said frame leg, in which each frame leg is formed to two parallel wire members joined at their base by a toe section formed as a U-shaped section of wire, said toe bent to rest in a plane parallel to the plane of the rim of the frame, with each said toe section aligned to extend in a direction away from the rim of the frame, and with each of the said parallel wire members joined to a separate leg of the U-shaped wire of the toe section at a first end of each frame leg and with each of the said parallel wire members joined to a separate border member of the rim such that an open recess continuously extends, from the open area bounded by the border members, to the open area bounded by the U-shaped wire of the toe section, with
the extension leg formed as a shaft, threaded along one end section, together with a pair of female threaded means of a size to each matingly engage the said end-section and to grip the toe section when the said end section extends through the open area bounded by the toe section, such that
the extension leg may be readily removed from an attached frame leg when said female threaded means are rotated away from each other, by sliding the said end section of the shaft, along said open recess into the open area bounded by the border members.

## 4,025,014
## STORAGE HOOK

Charles O. Larson, Sterling, Ill., assignor to Charles O. Larson Co., Sterling, Ill.

Filed Oct. 30, 1975, Ser. No. 627,239
Int. Cl.² F16M *13/00*
U.S. Cl. 248—203 1 Claim



1. A hook storage device for locking a hung object against unauthorized removal comprising, in combination: a galvanized J-shaped storage hook formed from a single length of rod stock and including a substantially straight and rigid leg and a smoothly curved bight lying in a single plane, the bight terminating at a point end in a closed eyelet, and at a head end in an open eyelet, the open eyelet and closed eyelet lying in planes substantially parallel to one another and perpendicular to the plane of the leg and bight; a matching galvanized eyebolt including a pointed tip and a single, elongated shank threaded over a portion only of its length and extending, in use, into a support and terminating in a closed eyelet at a head end enclosing a space sufficient to accommodate the hook open eyelet and a flexible connector, the eyebolt eyelet being oriented, in use, substantially vertically and perpendicularly to the planes of the hook head and point eyelets, the eyebolt

shank including an unthreaded shank length adjacent said eyebolt head extending over a distance as great as the thickness of the storage hook open eyelet to support the hook open eyelet and the storage hook when the eyebolt is secured to a support in a substantially horizontal position; flexible cable means passing, in use, through the closed hook eyelet, through an object hung upon the hook, and through the closed eyebolt eyelet; and locking means lockably attached to the two cable ends to positively lock the storage hook, hung object, eyebolt, flexible cable means and locking means itself together in a nondetachable, positively locked assembly.

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**4,025,015**

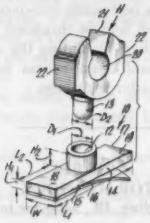
**DETACHABLE ARTICLE-MOUNTING DEVICE**

**Edwin S. Kolic, 544 Knights Ave., Gahanna, Ohio 43230**

**Filed Aug. 6, 1975, Ser. No. 602,447**

**Int. Cl.² F16M *11/32*; H02G *3/26***

**U.S. Cl. 248—205 A** **15 Claims**



1. Mounting means, comprising first and second adapters having plug-and-socket removable telescoping relatively smoothly cylindrical interference-fit friction engagement to each other, one of said adapters including means for mounting to a relatively fixed surface and the other of said adapters including means for mounting to an article to be remotely and removably supported with respect to the relatively fixed surface; said one adapter comprising a single unitary injection-molded plastic body of resiliently deformable material, said body having a continuous and imperforate elongate flat bottom of generally rectangular planiform, with an integral centrally located upstanding projection having an upwardly accessible formation for selective establishment of such plug-and-socket engagement, the remainder of said body being relatively thin and pliable in its extension both sides of said projection and coextensively with said bottom, the maximum effective width of said projection being at least no greater than one third the elongate extent of said bottom so that the pliable extensions of said bottom beyond said projection are each at least one third of said elongate extent, a self-sticking adhesive layer covering said bottom, and a protective strip of disposable sheet material peelably retained by the otherwise exposed surface of said adhesive layer, whereby the pliable extensions provide a substantial preponderance of adhesive-area contact as compared with the sectional area of plug-and-socket interfit, and further whereby said pliable extensions materially aid in the adaptability of the adhesive bottom surface to a variety of mounting-surface contours.

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**4,025,016**

**LADDER ATTACHMENTS**

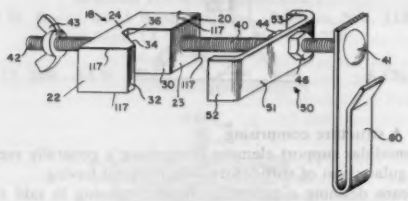
**Alvin O. Brothers, 2001 E. Franklin St., Evansville, Ind. 47711**

**Filed Feb. 4, 1976, Ser. No. 655,141**

**Int. Cl.² E06C *7/14*; B44D *3/14***

**U.S. Cl. 248—210** **1 Claim**

1. A ladder attachment comprising a clamp block having an alignment portion and a first clamping portion, said alignment portion and first clamping portion each having proximal and distal ends, said proximal end of said alignment portion providing an alignment surface for aligning said clamp block against a surface of said ladder, said proximal end of said first clamping portion providing a first clamping surface extending generally perpendicularly of said alignment surface, said block having a web portion joining said distal ends of said alignment and clamping portions to define a notch bound by said web, said alignment portion and said first clamping portion, a second clamp portion, threaded means for drawing said first clamping portion and second clamp portion into clamping engagement with a leg of said ladder, said threaded means having first and second ends, and a member for holding an article to be supported by said ladder, said holding member being supported by said attachment adjacent the first end of said threaded means and said clamp block being located inter-



mediate the first and second ends of said threaded means, said second clamp portion comprising a bracket including a back portion having two opposite ends, and one side portion extending generally perpendicularly to said back portion from one of said ends toward said clamp block, said threaded means including means for retaining said back portion off-center on said threaded means so that said side portion may be used to clamp said ladder attachment securely to a ladder leg having a flange along an edge thereof, and means for gripping a ladder leg having a generally rectangular transverse cross section, said gripping means protruding from said back portion proximate the remaining one of said ends thereof, said second clamp portion being located between said clamp block and said holding member.

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**4,025,017**

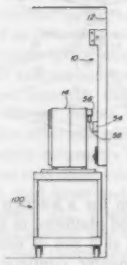
**WALL MOUNTED LIFT FOR A TELEVISION RECEIVER OR THE LIKE**

**Julius Miller, Melbourne, Fla., assignor to Electronic Sheet-metal Craftsmen of Florida, Inc., Melbourne, Fla.**

**Filed Oct. 14, 1975, Ser. No. 621,778**

**Int. Cl.² G12B *3/00*; A47G *29/00***

**U.S. Cl. 248—297** **6 Claims**



1. An appliance hoist, comprising

a. an elongated frame mountable to a vertical support,

b. said frame being formed with a vertical guideway,

c. a carriage mounted to said frame for movement along said guideway,

d. constant force spring means connected to said frame and to said carriage and urging said carriage normally upwards,

e. lock means operatively associated with said carriage and said frame for locking said carriage in a selected position along said guideway, and,

f. connector means mounted to said carriage for detachably engaging said appliance whereby said appliance may be reciprocated along said guideway upon disengagement of said lock means,

g. said spring means including a spool rotatably mounted to said frame and a prestressed normally coiled spring strip connected at one end to said spool and at the other end to said carriage, said strip being tightly wound in face-to-face convolutions when in a relaxed condition and being characterized by a natural tendency to recoil about said spool at a constant force when the other end is pulled straight from said spool, the straightened portion of said strip storing the recoiling force of said strip, the recoiling force of said spring being a function of the configuration of the strip between the coiled portion thereof and the straight portion thereof.

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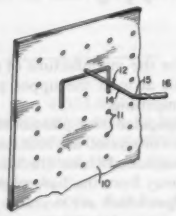
**4,025,018**

## PROTECTIVE TIP FOR PANEL BOARD HOOKS AND THE LIKE

**David R. Thalenfeld, 39 Water Mill Lane, Great Neck, N.Y. 11021**

**Filed Sept. 15, 1975, Ser. No. 613,227**
**Int. Cl.² A47F 7/00**
**U.S. Cl. 248—303** **5 Claims**




1. A protective tip for a wire display hook or the like having an end portion of generally cylindrical form, which comprises

a. a generally cylindrical body formed of soft, yieldable, resilient material and having an open end and a closed end,

b. said body being of hollow configuration forming an internal cavity, and having a side wall thickness dimension which is substantially less than the diameter of the internal cavity,

c. means forming an integral annular constriction in said cavity and defining an outwardly facing shoulder therein whereby the end face of said wire display hook will be seated against the shoulder upon placement of the body on the end portion of the hook,

d. said shoulder being spaced a substantial distance from each end of said body, whereby a substantial length of hollow cavity extends between said shoulder and the closed end of said body and a substantial length of sleeve-like wire gripping wall extends between said shoulder and the open end of said body, and whereby the end face of the wire display hook will be spaced a substantial distance from the closed end of said body, thereby utilizing the substantial length of hollow cavity as a protective tip for the wire display hook, and

e. said sleeve-like wall having an effective internal diameter at least slightly smaller than the diameter of said wire display hook.

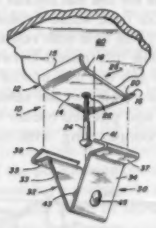


**4,025,019**

## CEILING FIXTURE AND HANGING CLAMP ASSEMBLY

**Arnold Ralph Jacobsen, Arlington Heights, and I. Pompe Jaffe, Skokie, both of Ill., assignors to Skyhook Sales Corporation, Niles, Ill.**

**Filed Oct. 7, 1976, Ser. No. 730,327**
**Int. Cl.² E04B 1/40, 5/52**
**U.S. Cl. 248—317** **5 Claims**



1. An improved ceiling support fixture and hanging clamp assembly comprising in combination,

a hanging clamp of the type formed by a V-shaped element providing two upwardly extending legs, each of the legs having a laterally outwardly extending flange portion and further provided with a return support flange portion,

said laterally outwardly extending flange portions and return support flange portions constructed and adapted to permit insertion of a ceiling support fixture therebetween,

a ceiling support fixture formed by an elongate support base terminating at opposed lateral ends,

said support base having mount means associated therewith for permitting the secure mounting of said ceiling support fixture to an overlying support surface,

said ceiling support fixture further provided with spacer means associated with said support base and said mount means such that upon mounting said support base upon an overlying support surface, said spacer means functions to space said support base a distance from said overlying support surface,

said spacer means further functioning to space said support base from said overlying support surface a distance sufficient to permit said return support flanges of said hanging clamp to be inserted between said support base and said overlying support surface,

whereby said ceiling support fixture may be fixedly secured by said mount means to an overlying support surface and said support base provides a support surface for supporting said hanging clamp by positioning said support base between said laterally outwardly extending flange portions and said return support flange portions of said hanging clamp whereby said clamp may be hung from and supported by said ceiling support fixture thereby to provide a hanging assembly for supporting a variety of articles therefrom.

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**4,025,020**

## ROCKER BASE

**McKinley Goff, Middletown, and Edward L. Hampton, Louisville, both of Ky., assignors to Leggett & Platt Incorporated, Carthage, Mo.**

**Filed Mar. 22, 1976, Ser. No. 669,263**
**Int. Cl.² A45D 19/04; A47J 47/16**
**U.S. Cl. 248—385** **8 Claims**

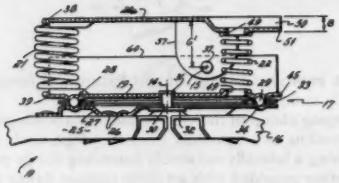
1. An improved rocker base for a rocking chair of the pivot support type, said rocker base being adaptable for use in any one of a pitched rocker base with hard rock position, a pitched rocker base with soft rock position, a flat rocker base with hard rock position, and a flat rocker base with soft rock position, said improvement comprising

a base plate,

a rocker plate selected from the group consisting of a first rocker plate having means for receiving a spring at one position relative to said first plate and a second rocker plate having means for receiving a spring at another position relative to said second rocker plate,

connector means for pivotally connecting said rocker plate to said base plate on a horizontal pivot axis, said connector means being structured to permit a pivotal connection point between said rocker plate and said base plate to be selected from one for the flat rocker base and another for the pitched rocker base while retaining substantially the same horizontal pivot axis with respect to the base plate,

a compression spring interposed between the rear end of said rocker plate and the rear end of said base plate, said compression spring being of the same spring characteristics for both flat and pitched rocker bases, and said compression spring cooperating with said spring receiving



means of said first rocker plate in a flat rocker base and cooperating with said spring receiving means of said second rocker plate in a pitched rocker base, the respective relationship of the spring receiving positions on said first and second rocker plates to the respective pivotal connection points being such that said compression spring is normally compressed substantially the same amount for both said flat rocker base and said pitched rocker base,

at least one double action spring fixed adjacent the other end of said base at one spring end to said rocker plate and at the other spring end to said base plate, and

mounting means on said rocker plate, said mounting means being cooperatively engageable with the chair's seat to permit selective mounting of the chair's seat onto said rocker plate in one of the hard rock and soft rock positions.

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**4,025,021**

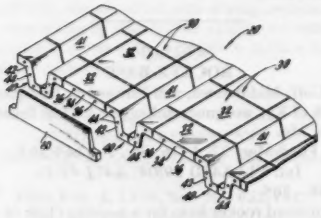
**CONCRETE FORM FOR CASTING-IN-PLACE A CONCRETE STRUCTURE**

**Robert K. Stout, Nizza 12, Piso 5°, Mexico D.F. 6, Mexico**

**Filed Feb. 17, 1976, Ser. No. 658,344**

**Int. Cl.² E04G *11/40***

**U.S. Cl. 249—61** **7 Claims**



1. A concrete form for casting-in-place a concrete structure comprising a plurality of metallic form members interconnected so as to define a planar form surface having a plurality of spaced, parallel elongated depressions so as to form a planar concrete structure which is reinforced by spaced, unitary, parallel strips of concrete, said plurality of metallic form members including planar forms extending between said depressions, each said planar form comprising a flat metallic sheet having a peripheral reinforcing flange including apertures therein, and elongated U-shaped forms defining the depressions, each said U-shaped form comprising two mirrored sections, of generally S-shaped configuration, each S-shaped section being of unitary construction and including peripheral flanges having openings to accept means for removably securing the forms together.

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**4,025,022**

**DIE MOLD**

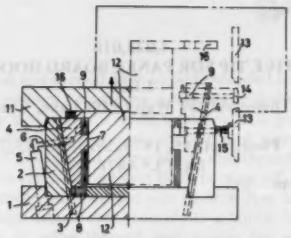
**Friedrich Theysohn, Hannover; Horst Gienapp, Langenhagen, and Horst Lange, Eilveste, all of Germany, assignors to The Firm Friedrich Theysohn, Hannover, Germany**

**Filed June 20, 1975, Ser. No. 588,820**

**Claims priority, application Germany, Aug. 27, 1974, 2440900**

**Int. Cl.² B41B *11/52*; B29C *1/14*; B28B *7/10***

**U.S. Cl. 249—63** **9 Claims**



1. A die mold for the manufacture of crate like containers having lateral walls at least the upper portion of which are double walled, comprising:

a generally rectangular base plate having corner cores jutting up at the corners of the base plate;

an inner core positioned above the base plate and movable toward and away from the base plate;

four lateral wedges which are movable upwardly and downwardly at a sharp angle to the vertical during opening and closing of the mold;

slider means positioned on said lateral wedges and movable with respect thereto and in a reciprocal direction relative to the walls of said containers;

cam control means for holding said slider means in the same position relative to said container during mold opening while said lateral wedges move upwardly and providing a backward movement of said slider means from said container walls after said container has been lifted a predetermined distance away from the base plate.

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**4,025,023**

**BURSTER APPARATUS**

**John Stuart Moffitt, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 31, 1975, Ser. No. 627,713**

**Int. Cl.² B26F *3/02***

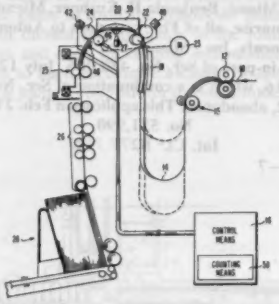
**U.S. Cl. 225—100** **12 Claims**

1. Apparatus for bursting into sheets a continuous form web as it is fed along a curved path comprising:

first feeding means for feeding a continuous form web having pre-weakened transverse lines along a curved path at a predetermined speed;

second feeding means mounted along said path at an angle to said first feeding means for feeding said continuous form web at a speed substantially faster than said first predetermined speed;

a curved guide member defining the outer curvature of said curved path, said guide member extending between said first and said second feeding means and having a continuous curved surface in which the linear dimension along one longitudinal edge of the surface is the same as the linear dimension along the opposite edge so that the curvature of the guide member directs said web squarely into said second feeding means;



means for selectively activating said second feeding means in response to an electrical control signal; and

means for producing an electrical control signal at a predetermined time and applying the signal to said means activating said second feeding means to separate said web into sheets at said pre-weakened transverse lines due to the angular disposition of said feeding means the defined curved path and the faster speed of said second feeding means.

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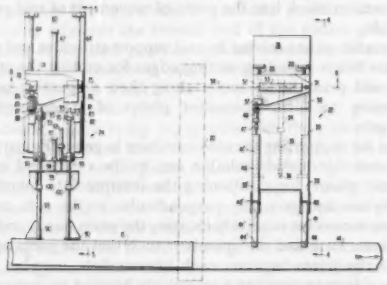
**4,025,024**

## METHOD AND APPARATUS FOR ALIGNING STRIP END PORTIONS IN A CONTINUOUS STRIP OPERATION

**Spencer L. Sorsen, Lake Bluff, Ill., assignor to National Steel Corporation, Pittsburgh, Pa.**

**Filed Apr. 15, 1976, Ser. No. 677,175**
**Int. Cl.² B65H *23/02***
**U.S. Cl. 226—3** **24 Claims**



23. In continuous strip handling utilizing apparatus having a longitudinal center line in the direction of strip movement through the apparatus where a longitudinal portion of the trailing end portion of a first strip is aligned with a longitudinal portion of the leading end portion of a second strip prior to the step of welding the strip end portions together, the method comprising

sensing the position of one side edge of the first strip trailing end portion at a first point along the length of the first strip,

sensing the position of the one side edge of the first strip trailing end portion at a second point along the length of the first strip spaced from the first point,

generating a signal indicative of the angle, if any, between the one side edge of the first strip trailing portion and the strip processing equipment center line,

generating a substantially nondivergent beam of radiant energy,

utilizing the signal to dispose the beam of radiant energy in a direction having a predetermined relation to the one side edge of the first strip trailing end portion,

disposing a strip positioning member having linearly aligned strip engaging elements along the length of one side edge of the second strip leading end portion, and

utilizing means responsive to the direction of the beam of radiant energy to dispose the linearly aligned strip engaging elements of the positioning member at the same angle to the strip processing equipment center line as the angle between the one side edge of the first strip trailing end portion and the strip processing equipment center line, if any, whereby the second strip leading end portion one side edge can be brought into registry with the strip positioning member for aligning the longitudinal portion of the second strip leading end portion with the longitudinal portion of the first strip trailing end portion.

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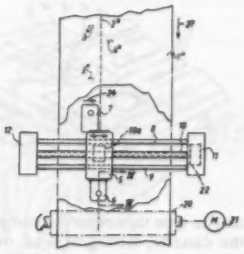
**4,025,025**

## APPARATUS FOR SCANNING A MARKED WEB

**Siegfried Bartel, Gauting, and August Hell, Deisenhofen, both of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany**

**Division of Ser. No. 581,572, May 28, 1975, abandoned. This application Aug. 5, 1976, Ser. No. 711,871**
**Claims priority, application Germany, May 30, 1974, 2425955**
**Int. Cl.² B65H *25/24***
**U.S. Cl. 226—33** **16 Claims**

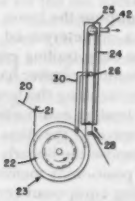


1. In a machine wherein an elongated web is transported longitudinally along a predetermined path and one side of the web has at least one longitudinally extending reference line and a plurality of equally spaced marks forming at least one row which is parallel to the reference line, a combination comprising means for advancing the web lengthwise along said path; and means for intermittently arresting said advancing means, including a first detector arranged to scan the reference line at said one side of the web in said path, means for moving said detector transversely of said path so as to maintain said detector in register with said reference line, and a second detector connected to and movable with said first detector and being in register with said row of marks, said second detector having means for producing signals in response to detection of successive marks and such signals serving to arrest said advancing means.

## 4,025,026
## APPARATUS AND METHOD FOR SUPPLYING CONSTANT TENSION MATERIAL

Robert E. Merritt, 832 Country Club Road, Mount Airy, N.C. 27030, and E. C. Tibbals, 1906 Pembroke Road, Greensboro, N.C. 27408

Filed Mar. 11, 1976, Ser. No. 665,937
Int. Cl.² B65H 23/18
U.S. Cl. 226—7 16 Claims

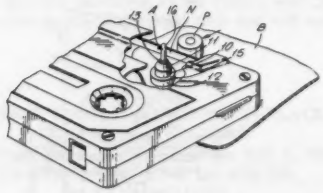



11. A method for supplying a continuous filament or web of material to a takeup under a constant uniform tension comprising: the steps of feeding material along a directed path of travel from a source of material supply, subjecting said material along its direct path of travel to fluid pressure in a confined chamber, passing said material around a grooved displaceable member in said chamber for displacement therein with said material, removing said material from said chamber to a material takeup, and controlling the supply of material fed to said chamber in response to the displacement of said displaceable member and said material in said chamber.

## 4,025,027
## TAPE PROPELLING MEANS IN CASSETTE-TYPE TAPE-RECORDERS

Ermanno Francolini, Rome, Italy, assignor to SPEM Societa Prodotti Elettronici Meccanici S.r.l., Rome, Italy

Filed Jan. 23, 1976, Ser. No. 651,977
Claims priority, application Italy, Jan. 29, 1975, 47899/75
Int. Cl.² B65H 17/22
U.S. Cl. 226—181 1 Claim

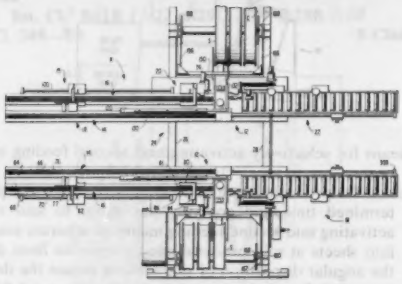



1. In a cassette type tape recorder comprising a housing for receiving the cassette, having at least one wall; a pressure roller for the tape; a capstan for propelling the tape, adapted to fit in an opening of said cassette behind said tape in respect of said pressure roller, and passing through and protruding from an opening in said wall; the improvement comprising guide bush means including: a base rigidly fixed to said wall, around said wall opening with an axial bore in alignment therewith; a cylindrical body, forming a step with said base, having an outer diameter slightly less than the diameter of said cassette opening, and having an upper portion of tapered configuration, said capstan being received in said axial bore of said bush means and protruding from the top of said bush means by a length identical with the width of said tape, said bush means body entering said cassette opening and centering the latter by means of said tapered upper portion thereof, keeping the cassette in position by means of said cylindrical body and supporting the cassette by means of the stepped base, said bush means further guiding a substantial length of the capstan, and thus reducing the chamber effect on the capstan length protruding from said wall opening in order to keep at a minimum the wow and flutter values in the tape recorder.

## 4,025,028
## BOX SPRING FRAME MACHINE

John Calvin Jureit, Coral Gables; Adolfo Castillo, Miami; Roy Leutwyler, Miami; Benjamin H. Kushner, Miami, and Larry Brodsky, Sunrise, all of Fla., assignors to Automated Building Components, Inc., Miami, Fla.

Continuation-in-part of Ser. No. 488,006, July 12, 1974, Pat. No. 3,913,816, which is a continuation of Ser. No. 317,095, Dec. 20, 1972, abandoned. This application Feb. 21, 1975, Ser. No. 551,990
Int. Cl.² B27F 7/00
U.S. Cl. 227—7 31 Claims



1. Apparatus for fabricating a wooden frame of the type having spaced generally parallel wooden side members and a plurality of spaced wooden intermediate members extending generally perpendicular between said side members and utilizing sheet metal connector stock of the type having a plurality of teeth struck integrally therefrom and from which discrete connector plates are formed for use in joining the side and intermediate members one to the other comprising:

support structure;

a pair of press heads carried by said support structure for movement along discrete predetermined paths;

means for moving said press heads along their respective predetermined paths;

means carried by said support structure for feeding the connector stock into the paths of movement of said press heads;

cooperable means carried by said support structure and said press heads including cutting edges for cutting the stock as said press heads move along their respective paths thereby to form connector plates of predetermined length;

means for supporting the side members in generally parallel spaced side-by-side relation one to the other and automatic means for positioning the intermediate members between and generally perpendicular to the side members; means for relatively locating the press heads and the intermediate and side members such that the press heads and the joints between each intermediate member and the side members are successively located in respective opposition to one another, said locating means includes means for advancing the side members and intermediate members of the partially completed frame after each joint formation therebetween relative to and in a direction away from the press heads, means releasably engageable with the partially completed frame after each advance thereof and of the last joined intermediate member a predetermined distance from said press heads for successively arresting movement of the partially completed frame thereby to space each last joined intermediate

member a specified distance from each next to be joined intermediate member;

said press heads being adapted to embed the teeth of the connector plates into one side of the joints of such adjoining intermediate and side members upon continued movement of said press heads along their respective paths and for each relative location of the press heads and the joints in opposition one to the other; and

control means for automatically actuating said press head moving means to move said press heads along their predetermined paths to form the connector plates and embed the teeth thereof into one side of the joints of the side members and each succeeding intermediate member in response to each successive location of said press heads and such joints in opposition to one another.

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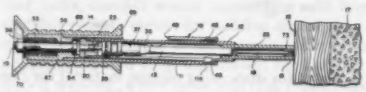
**4,025,029**

## HAMMER-ACTIVATED POWDER-ACTUATED FASTENING TOOL

**John A. Kotas, Chicago Heights, and Eugene J. Haupt, Flossmoor, both of Ill., assignors to DESA Industries, Inc.**

**Filed Feb. 9, 1976, Ser. No. 656,615**
**Int. Cl.² B25C *1/14***
**U.S. Cl. 227—10** **16 Claims**



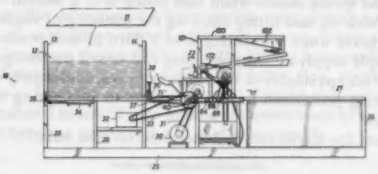
1. A hammer-activated power-actuated fastening tool having a tubular housing having front and rear ends, a tubular piston guide having a front muzzle end and a rear breech end slidably received within the housing and extending from the front end thereof and movable therewithin between a retracted, ready-to-fire position and an extended position, a piston slidably received within the piston guide and movable therewithin between a first or rearward position in which the piston is adjacent the breech end of the piston guide and a second or forward position spaced forwardly from the first position, and abutment means extending inwardly from the housing through a slot in the piston guide for limiting movement of the piston guide beyond its extended position, the abutment means being engageable with the piston as the piston guide is moved from its retracted position to its extended position to move the piston within the piston guide to its first position, the improvement comprising cartridge mounting means secured to the breech end of the piston guide for mounting a powder cartridge and firing means mounted on the housing rearwardly of the cartridge mounting means for firing a cartridge mounted within the cartridge mounting means, the firing means including an elongated firing pin having a front end engageable with a cartridge mounted within the cartridge mounting means when the piston guide is in its retracted position and a rear end engageable with a hammer, and a coil spring ensleeved over the firing pin and resiliently urging the front end of the firing pin away from the cartridge mounting means whereby a cartridge in the cartridge mounting means can be fired when the piston guide is in its retracted position by striking the rear end of the firing pin with sufficient force to move the firing pin forwardly against the bias of the spring and into engagement with the cartridge to fire the cartridge.

**4,025,030**

## APPARATUS FOR MAKING CARPET STRIPS

**James V. Lowery; Charles L. Lowery, both of 1020 Dorothy, Houston, Tex. 77008; Vernon L. Lowery, 5546 Hidalgo, Houston, Tex. 77027, and Jimmy R. Lowery, 10738 Bammel N. Hous. Road, Houston, Tex. 77040**

**Filed July 28, 1972, Ser. No. 276,131**
**Int. Cl.² B27F *7/02***
**U.S. Cl. 227—112** **10 Claims**



2. Apparatus for forming carpet tack strips, comprising:

means for temporarily receiving and securing a strip of material;

pneumatic tack setting means arranged for setting a plurality of tacks sequentially in such a strip of material;

nail setting means arranged for setting a plurality of nails in such a strip of material; and

said tack setting means and said nail setting means being positioned to set nails and tacks from opposite sides of the strip of material and wherein said tack setting means is at least duplicated to form at least two rows of tacks for at least two of such strips parallel to one another.

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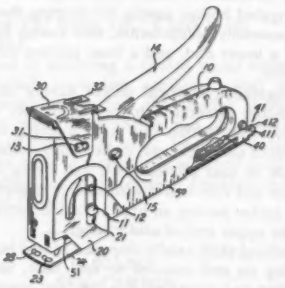
**4,025,031**

## STAPLING MACHINE

**Hui-Neng Chi, 58 Ta-Chih Road, Taichung, Taiwan, China /Taiwan**

**Filed Jan. 29, 1976, Ser. No. 653,357**
**Int. Cl.² B25C *5/02***
**U.S. Cl. 227—132** **3 Claims**



1. A spring-energized stapling machine for both paper-fastening and staple-injecting comprising:

a body including a base, an operating handle, and spring means for driving staples as a result of movement of said handle;

a check plate having a tip end and two parallel sides, each of said sides having a slot therein, said check plate being slidably mounted on said body by way of a pin extending through said body and through said slots in said check plate such that said check plate is slidable to a position in which the tip end of said check plate engages said operating handle and thereby obstructs the movement of said operating handle;

a movable fitting having an inverted U-shaped slot and two

recesses included therein, said fitting mounting upon said body by way of two pins which also define two alignment points which said movable fitting is slidable thereabout whereby said fitting is slidable through a plurality of angularly and longitudinally displaced positions, said fitting forming a backing plate to clinch the ends of staples in said recesses as said staples are driven for paper-fastening when said fitting is in a first of said positions, said fitting forming a safety shield to preclude accidental driving of staples by blocking the path of staples driven by said spring means when said fitting is in a second of said positions, said fitting allowing the injecting of staples into objects when said fitting is in a third of said positions;

a staple supply means possessing two sets of parallel grooves to accept staples of two different sizes, said supply means being positioned to supply staples to said spring means; and

means for staple removal mounted on said base.

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**4,025,032**

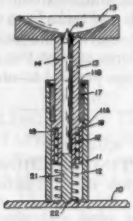
**ASSEMBLY DEVICE MOUNTING STICKS INTO FOOD**

**Fred O'Neil; Louise O'Neil, both of St. Paul, Minn., and Paul S. Ward, Costa Mesa, Calif., assignors to Champion International Corporation, Stamford, Conn.**

**Filed Oct. 30, 1975, Ser. No. 627,210**

**Int. Cl.² A47J *43/00***

**U.S. Cl. 227—141** **6 Claims**



1. An assembly device for inserting an elongated pliable stick into an article of food comprising:

an elongated hollow casing for limiting the movements of the assembly components, said casing having an upper end, a lower end, and a base portion on the lower end thereof,

an elongated cylindrical jacket having an axial opening extending therethrough for releaseably supporting said pliable stick within said axial opening along the entire length of said stick, said jacket being sustantially the same length as said pliable stick and being axially movable within and concentric with said elongated hollow casing, said jacket having an upper portion extending exteriorly of the upper end of said casing,

a cylindrical shaft axially disposed in said hollow casing and having an end secured to said base, said shaft having another end extending into the axial opening of the cylindrical jacket to engage and support one end of said pliable stick

resilient spring means mounted within said hollow casing extending between said base and the movable jacket for urging said jacket to a position wherein said pliable stick is substantially enclosed within the axial opening in said jacket,

limit means for preventing said cylindrical jacket from withdrawing from said casing, and

a receptacle having a base and an upright sidewall defining an enclosure and support for a portion of an article of food, said receptacle mounted on the upper portion of said jacket exteriorly of said casing,

said base of said receptacle having a second axial opening in communication with the axial opening in said cylindrical jacket to receive said stick within the interior of said receptacle prior to and during the insertion of said stick, whereby when a pliable stick is removably mounted within the axial openings in said jacket and receptacle and an article of food supported in said receptacle is pressed against the end of said pliable stick oppostie to said end which engages the cylindrical shaft and overcomes the urging force of said resilient spring means, said article of food, receptacle, and said cylindrical jacket are moved relative to said pliable stick to thereby force said pliable stick into said article of food.

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**4,025,033**

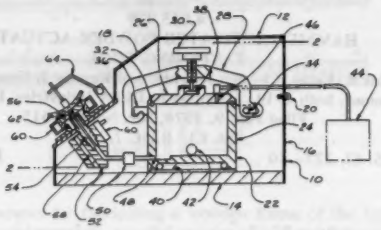
**APPARATUS FOR DISPENSING A BONDING AGENT**

**Lee R. Hodges, 14073 Passage Way, Largo, Fla. 33540**

**Continuation-in-part of Ser. No. 493,139, July 7, 1974, abandoned. This application Oct. 2, 1975, Ser. No. 618,745**

**Int. Cl.² B24B *13/00***

**U.S. Cl. 228—33** **6 Claims**



1. An apparatus for dispensing molten material for bonding a lens block and lens blank together, said apparatus comprising:

a. a hollow vessel including a vessel body having a vessel lid pivotally attached thereto, said vessel body having a discharge orifice formed therein and said vessel lid having a pressure feed orifice formed thereon;

b. a heating element disposed in the lower portion of said vessel body to heat the interior of said vessel;

c. a flow control means operatively coupled to the interior of said vessel through said discharge orifice, said flow control means movable between a first and second position;

d. means including a retaining clamp and a discharge nozzle coupled to said flow control means to support the lens block and lens blank in operative engagement relative to each other, said retaining clamp disposed to engage the lens blank and said discharge nozzle extending through the mid-portion of the lens block and disposed to feed molten material to the interface between the lens blank and lens block;

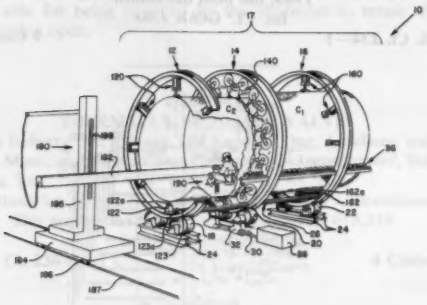
e. a second heating element affixed to said discharge nozzle to heat the molten material adjacent said vessel discharge nozzle;

f. pressurization means operatively coupled to the interior of said vessel through said pressure feed orifice such that pressure is applied through said pressure feed orifice against the molten material within said vessel, the molten metal flowing from the interior of said vessel through said discharge orifice and said discharge nozzle to the lens block and lens blank when said flow control means is in said firt position under a substantially constant flow rate, the molten material being isolated from said discharge nozzle when said flow control means is in said second position.

## 4,025,034
## FLUX BACKUP ARRANGEMENT FOR CIRCUMFERENTIAL WELDING

**Robert W. Randolph, St. Charles, and Steven L. Jantzen, St. Louis, both of Mo., assignors to ACF Industries, Incorporated, New York, N.Y.**

**Filed May 6, 1976, Ser. No. 683,821**
**Int. Cl.² B23K *9/02***
**U.S. Cl. 228—41** **10 Claims**



1. A flux back-up assembly for use in circumferential welding of abutting ends of tank courses comprising:

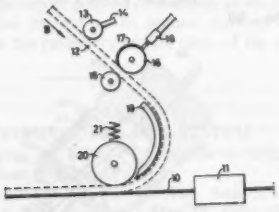
a hollow ring having a plurality of circumferentially spaced enclosed hoppers mounted thereon; jack means mounted on said ring and extendible radially relative to said ring to support and clamp the abutting ends of a pair of tank courses;

a flux back-up trough mounted upon the extendible ends of said jacks; conduit means connecting said hoppers with said flux trough, means for welding adjacent tank courses movable to a position at the lower portion of the internal periphery of said ring; and means for rotating said ring during welding, whereby as said ring rotates said hoppers and conduit means supply flux continuously to said flux back-up trough during the welding operation.

## 4,025,035
## METHOD OF AFFIXING SURFACE ENLARGING MEMBERS IN THE FORM OF COHERENT, TRANSVERSALLY CORRUGATED METAL STRIPS TO ELONGATE METAL BASIC PROFILES

**Karl Gunnar Jonason, Vasteras, Sweden, assignor to Granges Essem Aktiebolag, Vilsteras, Sweden**

**Filed Jan. 23, 1974, Ser. No. 435,993**
**Claims priority, application Sweden, Jan. 29, 1973, 7301211**
**Int. Cl.² B23K *1/02***
**U.S. Cl. 228—185** **13 Claims**



1. A method of affixing surface enlarging members in the form of coherent, transversally corrugated metal strips to elongate metal basic profiles which are continuously advanced in the direction of their longitudinal axes while simultaneously being joined by joining compound to the wave crests on one side of the corrugated metal strips, comprising the steps of heating the basic profile to a temperature which exceeds the melting point of the joining compound; continuously advancing the metal strips longitudinally externally of the movement path of the basic profile while applying the joining compound solely to said crests and solidifying a suitable portion of said compound at respective crests by conducting heat away from said compound through the strip material; continuously advancing the strip material with solidified joining compound on the crests thereof in side-by-side relationship with the heated basic profile; bringing said basic profile into contact with the crests of said strips coated with said joining compound to cause heat from the profile to melt the joining compound; and, immediately in conjunction with this latter step, conducting heat away from the joining compound through the corrugated strip material to solidify the joining compound and to establish a joint between each crest and said basic profile.

## 4,025,036
## PROCESS FOR FABRICATION OF HIGH IMPACT STRENGTH COMPOSITES

**Paul Melnyk, Parma, Ohio, assignor to TRW Inc., Cleveland, Ohio**

**Filed May 12, 1976, Ser. No. 685,812**
**Int. Cl.² B23K *19/00***
**U.S. Cl. 228—193** **10 Claims**

1. The method of diffusion bonding aluminum surfaces which comprises treating oxide-free surface of aluminum with an aqueous solution containing a sufficiently high chloride ion concentration to cause etch-pitting on said surfaces, and then diffusion bonding said surfaces together.

## 4,025,037
## PROCESS FOR SOLDERING AN ELECTROCOATED SUBSTRATE

**Kyoichi Shibayama; Hiroshi Ono; Eiki Jidai, and Hideo Saeki, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 522,763, Nov. 11, 1974, abandoned. This application May 28, 1975, Ser. No. 581,621**
**Claims priority, application Japan, Nov. 10, 1973, 48-126994**
**Int. Cl.² B23K *1/02*; C25D *13/06***
**U.S. Cl. 228—214** **5 Claims**

1. In a method of soldering a coated metal substrate, the improvement which comprises applying solder onto said coated metal substrate wherein the coating thereon is an electrodeposited water-dispersed varnish of a copolymer of 30–65 wt. parts of methacrylic ester, 10–40 wt. parts of acrylonitrile, 2–15 wt. parts of methacrylic acid and 3–30 wt. parts of an alkoxyacrylamide, vinyl acetate or a mixture thereof, per 100 parts of said varnish.

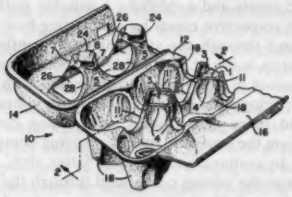
## 4,025,038
## EGG CARTON

**Richard F. Reifers, New Canaan, Conn.; Kenneth D. Bixler, Huntington, N.Y., and Henry A. Lord, Cape Elizabeth, Maine, assignors to Diamond International Corporation, New York, N.Y.**

**Continuation of Ser. No. 609,078, Aug. 29, 1975, abandoned. This application Jan. 30, 1976, Ser. No. 654,017**
**Int. Cl.² B65D *85/32***
**U.S. Cl. 229—2.5 EC** **12 Claims**

1. In an egg carton having one or more downposts in the cover and one or more up posts in the tray, apertures formed on each side of a downpost, "eye lids"posts, about the aperture formations, said "eye lids" extending from very steep walls in the cover and around the periphery of each of said apertures, said downpost having a stepped in plug-like formation at its extremity, said plug-like formation being in the

shape of a close polygon, each tray up post having a crater-like formation at its extremity adapted to receive the tip of each downpost, said crater being in the form of a closed polygon, the upper portions of the side walls of the up posts being thicker than other portions of said side walls of said up post, a



step portion of each of said downposts coming to rest on the upper portion of one of said up posts when said carton is initially closed with a space being maintained between the tip of the downpost and the bottom of the crater of the up post, which space may disappear when a plurality of loaded egg cartons are stacked on top of the cover of said carton.

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**4,025,039**

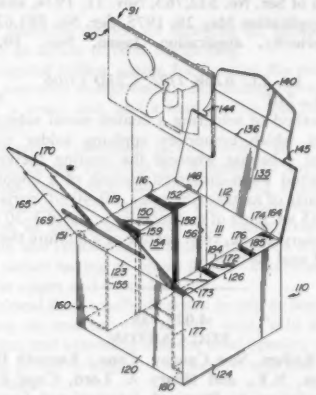
**CARTON FOR CARD-MOUNTED GOODS AND THE LIKE**

**Monte B. Croll, 8202 Douglass Road, Wyndmoor, Pa. 19118, and Lionel Croll, 10 W. 15th St., Barnegat Light, N.J. 08006**

**Filed July 26, 1976, Ser. No. 708,432**

**Int. Cl.² B65D** *5/48, 73/02*

**U.S. Cl. 229—27** **8 Claims**



1. A carton for carded packages and the like comprising a bottom wall, a pair of outer side walls upstanding from sides of said bottom wall, a pair of end walls upstanding from opposite ends of said bottom wall, a pair of inner side walls respectively adjacent to and inwardly of said pair of outer side walls, said inner side walls each being formed with a plurality of generally downwardly extending slots for receiving opposite margins of goods mounting cards with the mounted goods between said inner side walls, cover means extending between upper regions of said outer side and end walls, and flap means depending removably from said cover means into opposed slots.

**4,025,040**

**VOTING MACHINE WITH PUNCH CARD ATTACHMENT**

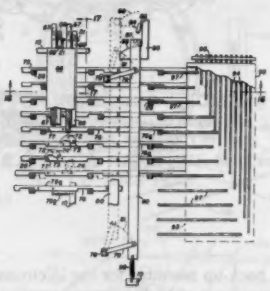
**Cothburn M. O'Neal, Arlington, Tex., assignor to Riverside Press, Inc., Tex.**

**Division of Ser. No. 199,069, Nov. 15, 1971, Pat. No. 3,846,718, which is a continuation of Ser. No. 35,671, May 8, 1970, Pat. No. 3,630,434, which is a division of Ser. No. 740,415, May 27, 1968, Pat. No. 3,524,969. This application July 22, 1974, Ser. No. 490,555**

**The portion of the term of this patent subsequent to Dec. 28, 1988, has been disclaimed.**

**Int. Cl.² G06K** *1/08*

**U.S. Cl. 234—1** **9 Claims**



1. In a machine for recording operator selections having multiple keys, each key representing a different possible selection, apparatus for making a permanent record of the operator selections comprising:

means for receiving a recording medium;

marking means adjacent said receiving means including multiple marking members each having an active and an inactive state, said members in the active state being adapted to record the operator selections on the recording medium;

means for interconnecting each of said selection keys with one of said marking members to orient in an active state each marking member corresponding to a selected key, said marking members being oriented independent of the orientation of any other said marking member; and

means associating said marking means with said receiving means for registering operator selections by simultaneously recording on said recording medium the orientation of each marking member in the active state.

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**4,025,041**

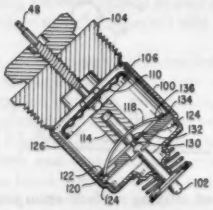
**SAFETY VALVE**

**Hugh J. Tyler, Santa Ana, Calif., assignor to Robertshaw Controls Company, Richmond, Va.**

**Division of Ser. No. 411,871, Nov. 1, 1973, Pat. No. 3,880,353. This application Apr. 28, 1975, Ser. No. 572,354**

**Int. Cl.² F23N** *1/00*

**U.S. Cl. 236—90** **9 Claims**



1. A safety valve comprising

a valve;

means for biasing the valve closed;
said biasing means including a housing, a plunger extending from the housing, a flange on the plunger, and a compression spring between the housing and flange;
means for retaining the valve open;
said retaining means including an abutment on the plunger;
a bulb containing an expandable fluid;
means responsive to the pressure of the fluid for releasing the retaining means; and
said releasing means including a member transversely movable for being engaged by the abutment to retain the valve open.

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**4,025,042**

## THERMALLY ACTUATED VALVE

**John Doherty, Jr., Assonet, and Youn H. Ting, Attleboro, both of Mass., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 428,595, Dec. 26, 1973, abandoned. This application Sept. 22, 1975, Ser. No. 615,316**

**Int. Cl.² G05D** *23/02*

**U.S. Cl. 236—101 C** **4 Claims**

1. A thermally actuated valve assembly comprising a housing with a recess therein, said housing having a passage therethrough, said passage having an inlet, an outlet and a valve seat between the inlet and outlet, a thermostatic dish-shaped bimetallic disk constituting a valve member adapted to abruptly move over center from a first curvature position in which the outer periphery of said disk is in engagement with said valve seat thereby to block communication through said passage and a second curvature position in which said disk is clear of said valve seat to permit the flow of fluid therethrough, said disk being movable from its first to its second curvature position upon being subjected to a first temperature and being reversibly movable from its second to its first curvature position upon being subjected to a second temperature, a retaining disk having means engageable with the walls of said recess for fixedly securing the retaining disk therein, said retaining disk essentially coextending over said bimetallic disk to partially shield said bimetallic disk and having a resiliently flexible arm engageable with said bimetallic disk biasing said biametallic disk towards said valve seat and holding said bimetallic disk in sealing engagement therewith when said bimetallic disk is in its first curvature position, and abutment means engageable by the center portion of said disk as the disk moves over center from its first to its second curvature position thereby to move the periphery of said clear of the valve seat.

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**4,025,043**

## FIREPLACE HEATING SYSTEM

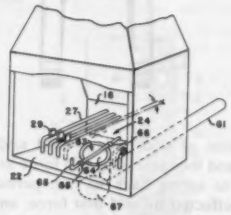
**Clarence W. Cleer, Jr., Kane, Pa., assignor to Ridgway Steel Fabricators, Inc., Ridgway, Pa.**

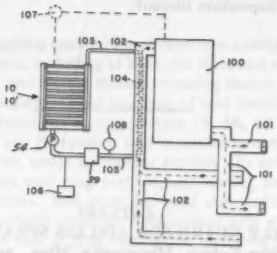
**Continuation-in-part of Ser. No. 495,107, Aug. 5, 1974, Pat. No. 3,958,755. This application May 18, 1976, Ser. No. 687,631**

**Int. Cl.² F24D** *5/00, 9/00*

**U.S. Cl. 237—53** **9 Claims**

1. A heating system for heating a confined area, said system comprising
a forced air furnace having hot air ducts extending therefrom and a cold air return extending thereto,
a fireplace jacket comprising means for circulating water directly around an open-hearth wood burning fireplace adapted to have an open fire therein, said fireplace jacket including wood supporting water conducting pipe portions and means for supporting said wood supporting water conducting pipe portions so that they make a positive angle of greater than 0° with respect to the horizontal,
a powered pump,





a liquid to air heat exchanger mounted within said furnace cold air return for transferring the heat of water circulating therethrough to air in said cold air return;
means for operatively connecting said pump, fireplace jacket, and heat exchanger so that water is circulated through said fireplace jacket and heat exchanger in a generally closed loop by said pump, and
an expansion tank operatively associated with said means for operatively connecting said pump, fireplace jacket, and heat exchanger together.

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**4,025,044**

## METHOD OF MAKING A RESILIENT DOUBLE C-SHAPED CLIP FOR SECURING A RAIL ON A SUPPORT AND A CLIP MADE BY THE USE OF THIS METHOD

**Lodewijk Goderbauer, Schaesberg, Netherlands, assignor to B.V. Schroefboutenfabriek v.h.Everts en van der Weijden, Heerlen, Netherlands**

**Filed Jan. 27, 1975, Ser. No. 544,377**

**Claims priority, application Netherlands, Feb. 26, 1974, 7402618**

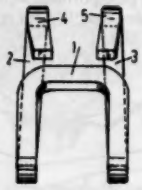
**Int. Cl.² E01B** *9/00*

**U.S. Cl. 238—349** **16 Claims**

1. The method of making a clip for securing a rail on a support, which comprises the steps of:
a. bending a length of bar material into a U-shaped configuration;
b. bending the U-shaped configuration of step (a) transversely of the plane of such configuration to define a generally C-shaped clip in which the free ends of the C-shape are laterally offset, in the plane of the C-shape, from a predetermined final disposition thereof;

c. subjecting the C-shaped clip to hardening and heat treatment;

d. fixedly holding one end of the C-shaped clip while exerting a first force against the other end of the clip in a direction and of such magnitude as to effect a continuous movement of said other end and produce a permanent



deformation of said ends toward said final disposition thereof, and then releasing said force to allow said ends of the clip to spring back to that permanently deformed position effected by said first force; and

e. repeating step (d) at least once with an increased force to effect further permanent deformation of said ends to said final disposition thereof.

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**4,025,045**

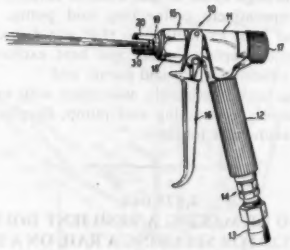
**NOZZLE GUARD FOR AIRLESS SPRAY PISTOLS**

**John William Kubiak, Minnetonka, Minn., assignor to Spray Tech Corporation, Minneapolis, Minn.**

**Filed July 21, 1975, Ser. No. 597,662**

**Int. Cl.² B05B** *1/04, 1/28*

**U.S. Cl. 239—288.5** **3 Claims**



**1.** A spray pistol which comprises a body having an externally threaded tubular projection receiving therethrough from the body, material to be sprayed, a nozzle tip with a spray pattern defining orifice overlying the outboard of said tubular projection, a seal between said tip and said projection, a tubular guard surrounding the inboard end of said nozzle tip and projecting therefrom to a free end substantially downstream from said orifice, a tip nut embracing the inboard end of said guard and threaded on said tubular projection for pressing said guard against said tip and said tip and seal against said tubular projection, and overlapping ledge and flange abutments between the tip and guard and the guard and tip nut with clearance between the tip and tip nut ledge and flange whereby said nozzle tip and seal will not be pressed against said projection unless said guard is in position around said nozzle tip.

**4,025,046**

**LIQUID ATOMISERS**

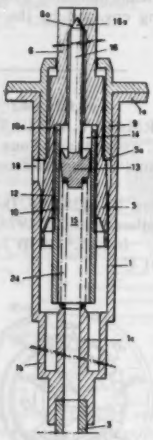
**Michel Boris, Paris, France, assignor to Societe Technique de Pulverisation, Paris, France**

**Filed Mar. 19, 1976, Ser. No. 668,600**

**Claims priority, application France, Mar. 28, 1975, 75.10688; June 19, 1975, 75.20179**

**Int. Cl.² B05B** *9/043*

**U.S. Cl. 239—333** **12 Claims**



**1.** In an atomizer,

cylinder means,

conduit means extending upwardly withinthe cylinder means to define therewith a pump chamber, said conduit means being capable of selective communication with the pump chamber,

inlet means communicating with the conduit means,

an atomizer nozzle;

passage means providing communication between the pump chamber and the nozzle,

a first piston member slidable in the cylinder to force liquid from the pump chamber to the nozzle via the passage means,

valve means operative to close the passage means in an inoperative condition of the atomizer, said valve means comprising means defining a valve seat movable with the first piston member, and a valve member engageable with the seat, the pressure of the liquid in the pump chamber tending to move the valve member out of engagement with the seat whereby to open the passage,

bias means biasing the valve member into engagewith the seat, and

means movable during operation of the piston member to engage the conduit means and interrupt communication between the conduit means and the pump chamber, said movable means being rigid with one of said members.

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**4,025,047**

**MOULDING FOR THE HEAT RETENTION OF FEEDER HEAD IN CASTING MOLTEN METALS**

**Masaru Takashima, Komae, Japan, assignor to Aikoh Co., Ltd., Tokyo, Japan**

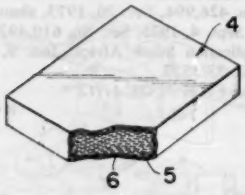
**Division of Ser. No. 460,048, April 11, 1974, Pat. No. 3,975,200. This application June 27, 1975, Ser. No. 590,800**

**Int. Cl.² B22D** *7/10*

**U.S. Cl. 249—204** **6 Claims**

**1.** A moulded slab for the retention of heat in an ingot mould comprising an inner layer having an elongated surface and an outer shell encapsulating said inner layer, said inner layer containing not less than 30 percent by weight of charcoal

particles with not less than 20 percent by weight of said charcoal particles being laminated in a direction parallel to the




elongated surface of the inner layer, and said shell comprised of fibrous materials and a binder therefor.

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**4,025,048**

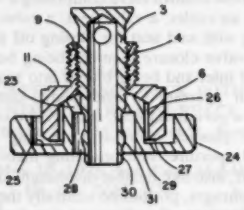
## CRANKCASE DRAIN ASSEMBLY

**Harry E. Tibbitts, Rte. 1, Coal City, Ill. 60416**

**Filed Dec. 10, 1975, Ser. No. 639,309**

**Int. Cl.² F16N** *1/00*

**U.S. Cl. 251—144** **1 Claim**




1. A crankcase drain assembly comprising manually operable valve means for mounting in the drain opening of a crankcase, including a body portion for mounting in said drain opening, a central bore through said body portion having an inlet opening comprising an inwardly tapering entrance region, said central bore of said body portion being internally threaded, a valve stem having an externally threaded shank mounted in said central bore of said body portion for cooperative threaded engagement therewith and for movement between an open and closed position upon rotation of said valve stem therein, said valve stem including a tapered head being tapered and dimensioned to seat in said inwardly tapering entrance region of said body portion when said valve stem is in said closed position, a central bore in said valve stem extending from a discharge aperture at the discharge end of said valve stem, inlet means extending through said valve stem opening to its said central bore for communication between the interior of said crankcase and said central bore when said valve stem is in said open position, said valve stem including a discharge spout at said discharge end thereof, said body portion of said valve means including an outwardly directed end portion thereof projecting outwardly from said crankcase when said body portion is mounted therein, a hub-receiving recess formed in said outwardly directed end portion of said body portion, a knob secured to said discharge end of said valve stem for rotation thereof, said knob having a radially projecting portion and an inwardly projecting hub, said inwardly projected hub being receivable in said hub-receiving recess of said body portion when said valve stem is rotated to said open position, a central bore through said hub to receive said discharge end of said valve stem there-through for securing said knob to said valve stem, said inwardly projecting hub including a recess extending inwardly from said radially projecting portion of said knob, said discharge spout of said valve stem extending through said recess of said hub and being spaced from the walls thereof to receive a flexible discharge tube thereon, said inwardly projecting hub surrounding and protecting said discharge spout of said valve stem.

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**4,025,049**

## HOSE COUPLING

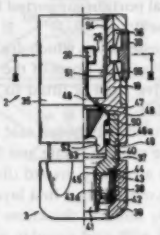
**Hans Joachim Schmidt, Wipperfurth, Germany, assignor to Armaturenfabrik Hermann Voss, Wipperfurth, Germany**

**Filed Sept. 16, 1975, Ser. No. 614,057**

**Claims priority, application Germany, Sept. 16, 1974, 2444245**

**Int. Cl.² F16L** *29/00, 37/28*

**U.S. Cl. 251—149.6** **13 Claims**



1. A hose coupling comprising at least two axially interconnectable members, including at least one male and at least one female portion, and having therein retaining means for releasably interconnecting at least one pair of said members, comprising in combination: a plug portion (1, 56, 63) having a shank region (14) therealong and a circumferential groove (15) in the latter; and a connector portion (2) axially interconnectable with said plug portion, and having at least one recess (23) therein, said plug and said connector portions having a substantially common longitudinal axis when interconnected, each said at least one recess including a cavity; a corresponding number of pivotally supported claws (20) in the latter, that constitute part of said retaining means, said claws each having a generally lengthwise axis oriented substantially transversally to said substantially common longitudinal axis, and being adapted to engage said groove when said plug and said connector portions are interconnected, each said claws including at one end a foot (21) mounted in said cavity and at the other end shoulder regions (26) and curved stop noses (32); said connector portion including a tubular main body portion (19) having through slots (25) at one end and edges(31) at another end, said shoulder regions (26) protruding through said slots for engagement with said circumferential groove, said noses (32) resting against said edges; and a single manually operable pressure member (33) slightly protruding from said connector portion and having a generally lengthwise axis oriented substantially transversally to said substantially common longitudinal axis and to the axis of said claws, the axis of said claws and said single manually operable member being normal to each other, said pressure member including means acting on said noses for releasing upon operation the interconnection between said plug and said connector portions, by moving said claws out of the engagement with said groove.

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**4,025,050**

## BUTTERFLY VALVE

**Yoshinori Manki, Nara, and Takayoshi Uno, Osaka, both of Japan, assignors to Tomoe Technical Research Company, Osaka, Japan**

**Filed Mar. 24, 1976, Ser. No. 669,859**

**Int. Cl.² F16K** *1/22*

**U.S. Cl. 251—306** **6 Claims**

1. A butterfly valve comprising:

a valve body consisting of upper and lower halves and having an annular projection formed at an inner peripheral

wall thereof for being accepted and held by an annular groove of a valve seat and further including annular end faces disposed so as to engage with corresponding faces of spaced apart conduits when installed therebetween;

a valve seat having an annular groove into which the projection of said valve body is fitted, and including an external peripheral surface which fits to an internal peripheral surface of said valve body and further including a seat surface formed at an internal peripheral surface thereof;

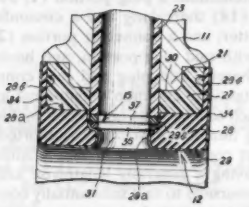
a rotatably supported valve stem passing through stem-inserting ports in said valve body and said valve seat, one end thereof protruding beyond the valve body;

a disk-shaped valve member with a peripheral edge thinner than its central portion supported by the valve stem inside of the valve seat;

annular sealing assemblies which are disposed in the interior of said stem-inserting ports of the valve seat and through which the valve stem is fitted to seal said ports around said valve stem, and

a stem guide provided between said stem and said body for permitting the stem to rotate and for pressing said sealing assemblies in a radially inward direction of said valve;

said valve seat comprising a first layer so formed as to have a substantially uniform thickness of hard synthetic resin and provided with said annular groove for fitting to the annular projection of the valve body, a second layer of resilient material covering the inner peripheral surface



and either side surface of said first layer, and a third layer comprising a substantially uniform thin film of fluororesin,

the inner peripheral portion of said second layer being sufficiently thick and resilient as to maintain the compression between the body and the valve disk in the closed position of the valve disk while the two side peripheral portions of the second layer, are less than half the thickness of the inner peripheral portion of the second layer so as to permit the space between said valve body and said conduits to be effectively sealed,

said third layer being adhered to the inner peripheral surface and either side surface of the second layer and further extending into the inner peripheral surface of the stem-inserting ports at least to the second layer through which said valve stem is inserted, and further provided with an annular projection at the inner peripheral surface of stem-inserting ports of the third layer so as to press radially inwardly the valve stem for sealing a space between the valve seat and the valve stem,

said seat surface of the valve seat comprising two side portions and a radially inwardly extending portion defined therebetween which presses radially inwardly the valve disk in the closed position,

and said annular sealing assemblies comprising a resilient rubber ring and an O-ring of fluororesin disposed nearer to the valve member than the rubber ring.

**4,025,051**

## FLUID FLOW CONTROL VALVE

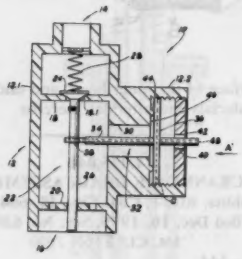
**Edgar Peter Scragg, 60 Mulder St., Florida Park Extension 3, Florida, Transvaal, South Africa**

**Continuation of Ser. No. 426,994, Dec. 20, 1973, abandoned. This application Sept. 4, 1975, Ser. No. 610,492**

**Claims priority, application South Africa, Jan. 9, 1973, 73/0159; May 25, 1973, 73/3577**

**Int. Cl.² F16K** *31/00, 41/12*

**U.S. Cl. 251—335 A** **8 Claims**



1. A fluid flow control valve comprising a valve body having an inlet and an outlet, a valve seat, a valve closure member co-operating with said seat for closing off the inlet from the outlet, said valve closure member being between said valve seat and said inlet and being biased into sealing contact with said seat, an aperture in said body, said aperture being bounded by a peripheral wall, and a valve-operating member of synthetic plastics material projecting from said body through said aperture, said operating member comprising a relatively stiff, disc-like flexible diaphragm and a stem integral with the diaphragm, positioned centrally thereof and projecting in both directions therefrom, an annular peripheral part of said diaphragm, and an annular inner part, said diaphragm adjacent to and encircling said stem, being thicker than a circumferentially extending region which lies between said peripheral part and said inner part, said diaphragm engaging said peripheral wall whereby the diaphragm seals said aperture, said region of the diaphragm, said stem and said inner part of the diaphragm being spaced from said body, and said stem and inner part being displaceable with respect to said peripheral part, said stem being attached, on one side of the diaphragm, to said valve closure member and on the other side of the diaphragm constituting an operating element the outer end of which can be displaced generally parallel to the plane of the diaphragm so as to pivot about a point located substantially in the medial plane between the faces of the diaphragm and displace said closure member with respect to the seat, the resultant distortion of the inner part of the diaphragm with respect to said peripheral part at said region creating a restoring force.

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**4,025,052**

## CLAMPS FOR WIRE ROPE, RODS AND TUBES

**W. W. Patterson, III, and Eugene F. Grapes, both c/o W. W. Patterson Co., 830 Brocket St., Pittsburgh, Pa. 15233**

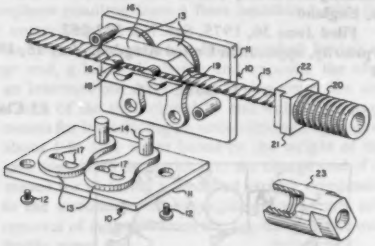
**Filed July 15, 1976, Ser. No. 705,526**

**Int. Cl.² B66F** *3/00*

**U.S. Cl. 254—76** **9 Claims**

1. A clamp for cable, rods and tubes comprising a housing, means in said housing engaging said cable, rod and tube on movement of said cable, rod and tube through said housing in one direction and releasing the same on movement in the opposite direction, a hollow screw adapted removably to bear

on the housing and surround said cable rod and tube at either side of said housing and nut means acting on said hollow



screw, one of said nut and screw acting on a load to adjust the housing with respect to said load.

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**4,025,053**

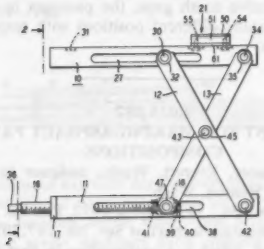
## SCREW ACTUATED SCISSOR JACK WITH A SELF ADJUSTING BEARING SURFACE

**Warren Edward Stickle, Jr., 134 Somerset St., Somerville, N.J. 08876**

**Filed May 10, 1976, Ser. No. 684,541**

**Int. Cl.² B66F *3/22***

**U.S. Cl. 254—122** **3 Claims**



**1.** A scissor jack arrangement comprising a pair of facing plate members relatively movable toward and away from each other, pairs of arms pivotally joined at their respective midsections and at their rearward lower and upper ends to ends of said plate members, forward ends of said pairs of arms being slidably joined to each of said facing plate members through an elongated slot opening associated therewith, an axle running transvese to said pairs of arms and slidably connected to each forward lower end of each of said arms, a threaded plate at an end opposite to where said rearward arm is pivotally joined to a lower one of said plate members, a threaded shaft being threaded into said threaded plate and fixedly secured to said axle for movement of forward and rearward ends of said respective arms toward and away from each other, a floating loadbearing platform slidably mounted on a top one of said plate members for movement longitudinally therealong, and said platform includes downwardly extending securement pins interfitted with elongated apertures in said top plate member situated substantially centrally between said pair of arms, and lubricating strips running longitudinally between said top plate member and said platform for self-lubricating movement of said platform.

**4,025,054**

## ARMS FOR PANTOGRAPH JACK

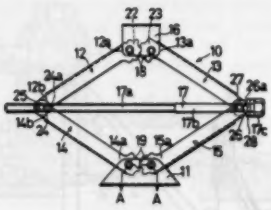
**Shinichiro Yamazaki, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

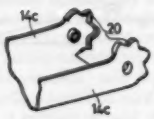
**Filed May 8, 1975, Ser. No. 575,486**

**Claims priority, application Japan, May 8, 1974, 49-52650[U]**

**Int. Cl.² B66F *3/12***

**U.S. Cl. 254—126** **1 Claim**





**1.** A pantograph jack for lifting and lowering a vehicle chassis or the like comprising:

a base support member on which movable parts of the jack are supported;

a load mounting stand positioned in parallel relation to said base support member for holding the load thereupon during the lifting and lowering operations of the jack;

a pair of upper arms, U-shaped in cross-section, each having one end thereof being rotatably mounted on said load mounting stand and having gear teeth provided upon opposite side walls of said U-shaped arms so as to face each other and on said one end thereof in meshing engagement with each other;

the other end of each of said upper arms being operated by a manually operated rod member;

a pair of lower arms, U-shaped in cross-section, each having one end thereof being rotatably mounted on said base support member and having gear teeth provided upon opposite side walls of said U-shaped arms so as to face each other and on said one end thereof in meshing engagement with each other;

the other end of each of said lower arms being operated by said manually operated rod member;

said gear teth of said lower and upper arms comprising integral flange portions extending only inwardly at substantially a right angle from, and formed about the periphery of, said opposite side walls of said one end of each of said arms; and

the width of each flange portion, upon which said gear teeth are disposed, being greater than that of each opposite side wall of each of said arms.

4,025,055

## APPARATUS FOR USE IN RAISING OR LOWERING A LOAD IN A CONDITION OF RELATIVE MOTION

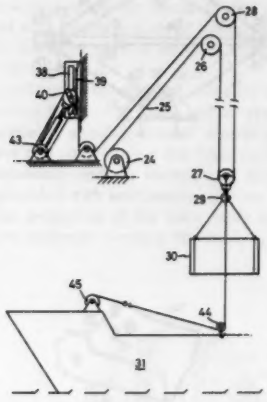
Willem Josef George Strolenberg, 3, The Weavers, The Green, Long Melford, Suffolk, England

Filed July 7, 1975, Ser. No. 593,505

Claims priority, application United Kingdom, July 30, 1974, 33589/74

Int. Cl.² B66D 1/48

U.S. Cl. 254—172 27 Claims




1. An improvement in wave compensating apparatus for an off-shore crane, said crane being provided for unloading and loading a vessel which moves relative thereto due to wave motion, said crane including primary drive means, load attachment means and line means connecting said primary drive means to said load attachment means; said wave compensating apparatus including hydraulically driven means for taking up and paying out said line means, hydro-pneumatic means acting on said hydraulically driven means for tensioning said line means to compensate for said wave motion, said hydro-pneumatic means including first accumulator means for imparting a light tension to said line means, said light tension being equivalent to a minor proportion of the weight of said load, and unidirectional locking means for preventing said line means from lowering said load from the crest of said wave motion, the improving comprising:

second accumulator means for imparting a high tension to said line means, said high tension being applied to said line means for prestressing the load supporting system when unloading and for supporting said load when loading; said high tension being equivalent to a major proportion of, but not exceeding the weight of said load when unloading, and being greater than said load when loading; and

selector means coupled to said first and second accumulator means and to said hydraulically driven means, said selector means operable to selectively connect said first and second accumulator means to said hydraulically driven means for applying said respective light and high tensions to said line means.

4,025,056

## MIXING APPARATUS

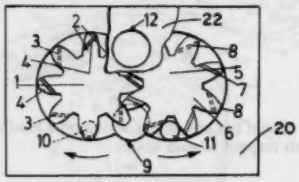
David Roy Miles, and Alun Woolcock, both of Pontypool, England, assignors to Imperial Chemical Industries Limited, London, England

Filed June 30, 1975, Ser. No. 592,052

Claims priority, application United Kingdom, July 15, 1974, 31154/74

Int. Cl.² B01F 7/16

U.S. Cl. 259—6 13 Claims




1. In a gear pump having a housing forming a pump chamber having a curved wall and provided with at least one primary inlet port and at least one primary outlet port for the chamber, at least two intermeshing gears rotatably mounted in the chamber, each of said gears including teeth having front and rear sides and flat end faces and said gears cooperating with the curved wall of the chamber and with the ports to pump fluid from the inlet port to the outlet port, the improved construction which facilitates limited flow of fluid between consecutive tooth gaps when the associated teeth are in proximity to the curved wall of the pump chamber, said improved construction comprising an arrangement in which teeth of both gears have a passage extending from the root of the respective tooth on one side thereof toward the crest of that tooth the other side of that tooth for permitting said flow between consecutive tooth gaps, the passages in successive teeth being in axially different positions with respect to the axes of the gears.

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4,025,057

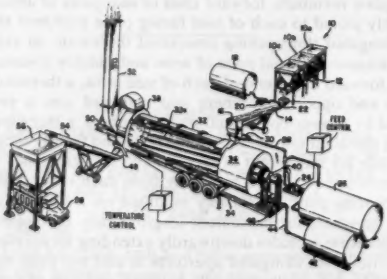
## EQUIPMENT FOR MAKING ASPHALT PAVING COMPOSITIONS

Herbert N. Shearer, Everett, Wash., assignor to Pavement Systems, Inc., Renton, Wash.

Division of Ser. No. 303,309, Nov. 3, 1972, Pat. No. 3,832,201, which is a continuation-in-part of Ser. No. 167,702, July 30, 1971, abandoned, which is a continuation-in-part of Ser. No. 60,284, Aug. 3, 1970, abandoned. This application July 18, 1974, Ser. No. 489,581

Int. Cl.² B28C 5/06

U.S. Cl. 259—154 6 Claims



1. A plant for the preparation of asphalt paving compositions by coating of aggregate with a liquefied asphalt composi-

tion wherein a paving composition is discharged having uniform compaction, wherein there is less aging of the asphalt composition during coating of the aggregate and wherein there is reduced amount of air pollution discharge into the atmosphere resulting from a fines associated with the aggregate, comprising:

1. an inclined, rotatable, cylindrical shell having an upper charge end, a lower discharge end opposite the charge end and an intermediate mixing and drying zone, the upper and lower ends of the shell closed by end walls,
2. means for introducing an unconditioned aggregate having about 1 to 10% water based on the weight of the aggregate associated therewith into the charge end of the shell,
3. means for metering a liquefied asphalt composition onto to the unconditioned aggregate prior to any substantial removal of moisture from the aggregate in the mixing and drying zone, and
4. means for removing moisture from the asphalt-aggregate mixture in the mixing and drying zone as it progesses from the charge end through the mixing and drying zone to the discharge end of the shell.

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**4,025,058**

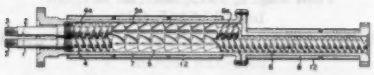
## CONTINUOUS EXTRUDER FOR THERMOSETTING RESINS

**Hideki Mizuguchi, Hiroshima, Japan, assignor to Japan Steel Works, Ltd.; DAI Nippon Toryo Co. Ltd., both of Japan**

**Filed Aug. 14, 1975, Ser. No. 604,531**

**Int. Cl.² B29B *1/10***

**U.S. Cl. 259—192** **4 Claims**



1. A continuous extruder for thermosetting resins, comprising first and second oppositely rotatable screw members and an elongate housing within which said screw members are located, said screw members each comprising a first, feed portion for feeding raw materials forwardly along said housing, a second, rotor portion, having discontinuous flights, for kneading and mixing the raw materials fed thereto from said feed portion, and a third, discharge portion for discharging the kneaded and mixed raw materials under pressure, at least the feed portions of said screw members meshing with each other so as to provide uniform feeding of the raw materials, said housing including first, second and third orifices, located at said feed portions of said screw members, for receiving thermosetting resin materials, filler materials and reinforcing materials, respectively, said housing being open at the end thereof opposite to the feed portions of said screw members, and including jacket means, in surrounding relationship thereto, for controlling the temperature of the raw materials received by the extruder, said rotor portions of said screw members being constituted by a series of rotor sections which intermesh to provide forward feeding of the raw materials; each of said rotor sections having a cross-sectional design corresponding to that of batch-type Banbury-type rotor blades and oppositely projecting blades of each of said rotor sections being respectively twisted oppositely at a given angle between both ends, each of said blades being twisted by substantially 90° along the length thereof between the ends of the blade.

**4,025,059**

## DEVICE FOR THE CONTINUOUS PRODUCTION OF STEEL

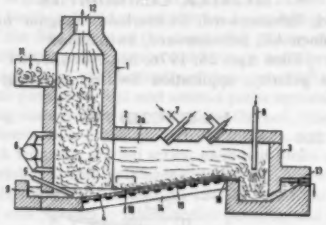
**Eberhard Steinmetz, and Jürgen Kuhn, both of Bochum, Germany, assignors to Fried. Krupp Huttenwerke AG, Bochum, Germany**

**Filed Apr. 8, 1975, Ser. No. 566,642**

**Claims priority, application Germany, Apr. 13, 1974, 2418109**

**Int. Cl.² C21C *7/00***

**U.S. Cl. 266—215** **20 Claims**



1. Apparatus for the continuous production of steel comprising a generally vertical shaft melting zone having a floor, means for feeding solid pig iron, scrap iron or sponge iron to an upper region of said vertical shaft melting zone, means for melting said pig iron, scrap iron or sponge iron in said vertical shaft melting zone, a generally horizontally running refining zone in fluid communication with a lower region of said shaft, a portion of the wall of said vertical shaft forming a generally vertically disposed weir in facing relationship with the floor of said shaft to define a fluid entrance, said floor having connected thereto exteriorly of said wall of said vertical shaft a vertical riser overlapping a portion of said wall to define a reservoir zone, said reservoir zone being in fluid communication via said fluid entrance with the interior of said vertical shaft, the floor of said refining zone disposed upwardly at an inclination with respect to the floor of said shaft and being in the form of an electromagnetic countercurrent flow channel, said horizontally running refining zone being in fluid communication with an oxidation zone comprising a well disposed below the level of the floor of said refining zone.

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**4,025,060**

## MOLTEN METAL POURING DEVICE

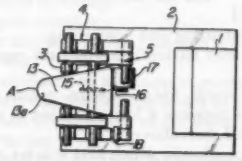
**Masakatsu Fujie, Ushikumachi; Hiroshi Yamamoto, Shimoinayoshi, and Atsushi Matsuzaki, Tokyo, all of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Sept. 8, 1976, Ser. No. 721,411**

**Claims priority, application Japan, Sept. 22, 1975, 50-113676**

**Int. Cl.² B67D *5/64***

**U.S. Cl. 266—240** **5 Claims**



1. In a molten metal pouring device, the improvements comprising;

two pairs of link mechanisms each having a pair of links, respective links of said two pairs of link mechanisms being turned in parallel relation to each other;

a ladle rotatably mounted on one ends of respective links of one pair of link mechanisms; and

posts for supporting the other ends of said respective links;

said ladle being arranged, in a manner to position its beak in accord with a point, at which an extension of a line connecting one ends of respective links together intersects with an extension of a line connecting the other ends of respective links; together.

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**4,025,061**

## APPARATUS FOR HEAT TREATMENT OF DISCRETE METALLIC COMMODITIES

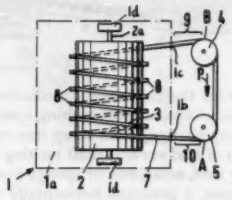
**Max Frei, Schonenwerd, Switzerland, assignor to Schenker Maschinen AG, Schonenwerd, Switzerland**

**Filed Apr. 28, 1976, Ser. No. 680,901**

**Claims priority, application Switzerland, May 5, 1975, 5735/75**

**Int. Cl.² C21D *1/00***

**U.S. Cl. 266—249** **17 Claims**




1. Apparatus for conditioning discrete commodities, particularly for heating metallic stock in the chamber of a furnace, comprising means defining a conditioning chamber wherein the temperature differs from the temperature of the surrounding atmosphere; and means for transporting commodities through said chamber, including first support means in said chamber, second support means outside of said chamber, an endless flexible element trained around said first and second support means and having at least one holder for commodities to be conditioned in said chamber, and means for moving said flexible element lengthwise so that said holder advances along an endless path, said moving means comprising a variable-speed prime mover and said first support means having guide means defining at least one inclined portion of said path within said chamber, said flexible element having at least one helical portion which is formed by said guide means and is located in said chamber.

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**4,025,062**

## THERMAL DEBURRING UNIT

**Richard T. Johnstone, Lake Orion; Alfred C. Montag, Grosse Pointe Park; Charles H. Franklin, and Clarence S. Vinton, both of Ann Arbor, all of Mich., assignors to Surftran Company, Madison Heights, Mich.**

**Filed Mar. 8, 1976, Ser. No. 664,651**

**Int. Cl.² B24C *1/00***

**U.S. Cl. 266—251** **22 Claims**

1. A thermal deburring unit comprising,

a thermal chamber having a downwardly open upper closure,

a vertically movable lower closure, means moving said lower closure between a lower position in which articles may be placed thereabove,

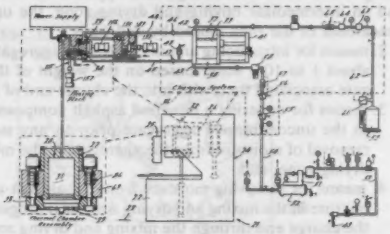
and an upper position in which said articles are within the upper closure,

pressure tight seal means between said closures when the lower closure is in its upper position,

circumferentially arranged upwardly and downwardly facing surfaces on said upper and lower closures respectively,

clamping means having a first portion engageable with the surface of said upper closure and a second portion engageable with the surface of said lower closure,

tightening means movable between a sealing position in which said two clamping means portions are drawn together after said upper closure has been moved to its upper position,



and a non-sealing position,

means supplying pressurized combustible gases into said chamber after said tightening means has been moved to its sealing position,

and means for igniting said pressurized gases.

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**4,025,063**

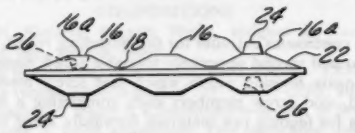
## CUSHIONING PAD

**Donald Willison, Lyndhurst, Ohio, assignor to Midland-Ross Corporation, Cleveland, Ohio**

**Filed Aug. 1, 1975, Ser. No. 601,320**

**Int. Cl.² F16F *1/36***

**U.S. Cl. 267—153** **10 Claims**

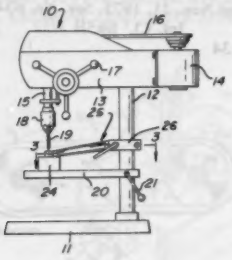



1. A cushioning pad for assembly with other similar pads into a group, said pad comprising a plate member having a cushion of resilient material secured to at least one side thereof, and means for gathering and aligning said pad relative to another similar pad whereby said cushion is directly in contact with the cushion of the other pad, said means comprising an integral dowel in the shape of the frustum of a cone extending outwardly from the face of said cushion and a corresponding frusto-conically shaped dowel receiving recess in the face of the cushion and being spaced from said dowel, said dowel having a side surface whose taper relative to the longitudinal centerline thereof is slightly greater than the taper of the side surface of said recess, the taper of said side surface of the dowel being of such an angle as to effect gathering action between said dowel and the surface of the recess of the adjacent laterally displaced similar pad whereby said cushion is brought into accurate alignment with the opposing cushion when said pad is assembled with another similar pad, the engagement between said dowel and recess ranging from line to line fit to an interference fit when said dowel is within said recess.

## 4,025,064
## WORK HOLD-DOWN FOR A MACHINE TOOL HAVING A TABLE AND COLUMN

Horace C. Disston, Jr.; Timothy Eichfeld, and Leonard Van Dalen, all of 802 Olive St., Cherry Hill, N.J. 08034

Filed Feb. 9, 1976, Ser. No. 656,172
Int. Cl.² B25B *1/00*
U.S. Cl. 269—87.3 7 Claims

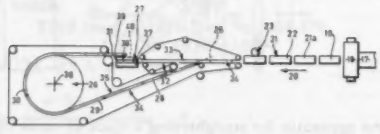


1. A work hold-down for use with a machine tool having a work table and an upstanding column, said work hold-down comprising a sleeve having an internal dimension greater than the external dimension of and loosely circumposed about a machine tool column or sliding therealong and tiltable about a generally horizontal axes between a longitudinal position relative to and slidable on the column and a canted position jammed against upward movement along the column, said sleeve being releasably contractable about said column to urge the sleeve from its canted position toward its longitudinal position, an arm extending from said sleeve for location over said table and movable with said sleeve between an outstanding position and an upwardly swung position upon sleeve movement between respective longitudinal and canted positions, whereby said arm is downwardly engageable with a workpiece on said table in the upwardly swung arm position to releasably clamp the workpiece on the table upon contraction of said sleeve.

## 4,025,065
## METHOD OF AND MACHINERY FOR PRODUCING BOOK BLOCKS

Ernest Arthur Timson, Kettering, England, assignor to Timsons Limited, Kettering, England

Filed May 27, 1975, Ser. No. 581,030
Claims priority, application United Kingdom, May 31, 1974, 24355/74
Int. Cl.² B41F *13/64*
U.S. Cl. 270—12 2 Claims

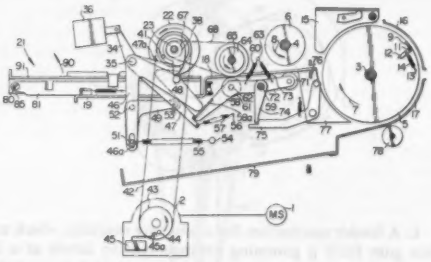


1. Apparatus for assembling a block for a double book or double hook section in a 2-up coming and going method of bookmaking in which successive lengths of a paper web have each been identically printed so that each length shows in total a number of primary book pages each of which appears once only, the apparatus comprising a supply means arranged to supply groups a book elements, each group consisting of leaves formed by cutting and slitting one of said lengths and containing all of said primary pages arranged in pairs on the leaves head to head or tail to tail, with each pair of pages meeting in a junction; a combining station, means for feeding said groups in a stream along a first rectilinear path towards said combining station; a rotary member arranged to turn over a succession of said groups through 180° about an axis parallel to the junction between said two pages printed on the leaves of the group; means for diverting alternate groups of the stream from said first path, said alternate groups forming a first series and being turned by said rotary member; means for conveying the remaining groups of the stream and which form a second series from said diverter means along said first path to said combining station; means between said supply means and said combining station for collating the elements of each group into a half-block before the groups reach said combining station; said combining station including means for bringing together in pairs, to form blocks, half-blocks of said first series and half-blocks of said second series by bringing each half-block of the first series to the combining station along a second rectilinear path between said rotary member and said combining station, said second path being parallel to said first rectilinear path, said first and second paths approaching said combining station from opposite sides thereof, whereby each block comprises one half-block from the first series and one half-block from the second series, each half-block of the first series arriving at said combining station in an orientation in which it has been turned through 180° by said rotary member about an axis parallel to said junction between said two pages printed on the leaves of the half-block of the first series relative to the orientation of each half-block of said second series arriving at said combining station.

## 4,025,066
## SHEET FEED DEVICE FOR A FACSIMILE SYSTEM

Takaji Sue, Tokyo, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 507,144, Sept. 18, 1974, abandoned.
This application Jan. 14, 1976, Ser. No. 648,871
Claims priority, application Japan, Sept. 29, 1973, 48-109583
Int. Cl.² B65H *3/44*, *1/12*
U.S. Cl. 271—9 10 Claims



1. A sheet feed device for a duplicating system comprising:
a. a cassette means for holding sheets to be fed in a predetermined direction to said duplicating system, said cassette means including:
i. a support member;
ii. a first tray for receiving thereon a first stack of sheets to be fed;
iii. a pivot means on said support member for supporting said first tray for pivoting about an axis normal to the direction of movement of the sheets fed from the cassette means;
iv. a second tray for receiving thereon a second stack of sheets to be fed; and
v. means for slidably mounting said second tray above said first tray for movement between a first and a second position relative to the first tray in the direction of movement of the sheets and for movement by, and in the same direction as, said first tray upon the pivoting thereof, when in said first position, the first stack of

sheets on said first tray and the second stack of sheets on said second tray being in substantially overlapping relationship when the second tray is in its first position and the stack of sheets on the second tray being displaced in a direction opposite to the direction of movement of the sheets a distance large enough to expose at least the leading end portions of the sheets on the first tray when the second tray is in its second position;

b. a cassette table attached to said duplicating system for removably receiving and supporting said cassette means thereon;

c. feed means disposed on said duplicating system above said cassette table for contacting an uppermost sheet of the first stack of sheets on said first tray in said cassette means when said second tray is in its second position and for contacting an uppermost sheet of the second stack of sheets on said second tray when said second tray is in its first position, said feed means removing the appropriate uppermost sheets from the cassette means by frictional engagement; and

d. lifting means for moving said first tray about said pivot means relative to said support member to bring the appropriate uppermost sheet of the stacks of sheets on said cassette means into frictional engagement with said feed means.

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**4,025,067**

## FEEDER MECHANISM FOR A LABELLING MACHINE

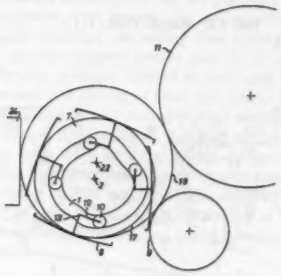
**Ernst Schlacht, Berlin, Germany, assignor to Johann Weiss Maschinenfabrik und Apparatebau GmbH, Berlin, Germany**

**Filed July 3, 1975, Ser. No. 593,069**

**Claims priority, application Germany, July 4, 1974, 2432433**

**Int. Cl.² B65C 9/12; B65H 3/20**

**U.S. Cl. 271—33** **5 Claims**



1. A feeder mechanism for a labelling machine which transfers gum from a gumming arrangement to labels at a label supply location and conveys labels from the label supply location to transfer means, the mechanism including a feeder member which carries at least one label receiving element, which is mounted on the feeder member by means of a pivot shaft, the feeder member being drivable about a rotary axis of the feeder member and bodily around a circular path about a central axis, the pivot axis of said pivot shaft being parallel to the rotary axis of the feeder member, whereby the pivot axis of said pivot shaft moves in a direction perpendicular to said pivot axis axial direction and describes a looped hypotrochoid, means being provided to control the orientation of said label receiving element about the axis of said pivot shaft in dependence on the orientation of the feeder member about the feeder member rotary axis, said orientation control means comprising: a cam plate for controlling the orientation of said label receiving element, said cam plate being mounted to undergo bodily movement around the circular path about said central axis with the feeder member and arranged non-rotatable relatively to the rotary axis of said feeder member, a cam follower on the pivot shaft of said label receiving element, said cam follower engaging said cam plate, whereby rotation of the feeder member about its rotary axis relative to the cam plate causes said pivot shaft to rock.

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**4,025,068**

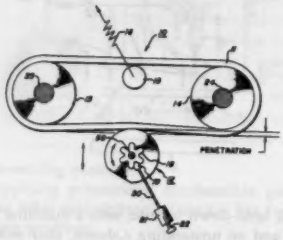
## SHEET FEEDER

**Joseph M. Collins, Ontario, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Nov. 21, 1975, Ser. No. 634,016**

**Int. Cl.² B65H 3/52**

**U.S. Cl. 271—34** **22 Claims**



1. In a sheet feeder having a deformable member and a retard member deformably penetrating into the deformable member to separate sheets fed by the deformable member; the improvement comprising: means integral with the periphery of the retard member for setting the proper penetration depth of the retard member into said deformable member.

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**4,025,069**

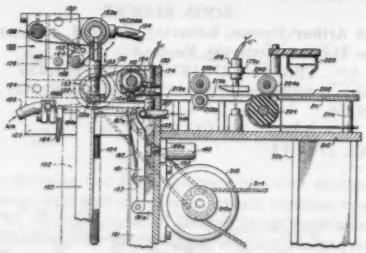
## APPARATUS FOR AUTOMATIC MICROPHOTOGRAPHY

**Andrew L. Amort, Ann Arbor, Mich., assignor to Xerox Corporation, Stamford, Conn.**

**Division of Ser. No. 526,250, Nov. 22, 1974, Pat. No. 3,947,118. This application Mar. 25, 1975, Ser. No. 561,969**

**Int. Cl.² B65H 1/04, 31/34**

**U.S. Cl. 271—147** **1 Claim**



1. An apparatus for straightening a stack of cards comprising:

a frame;

an arm pivotally secured to said frame at one end thereof;

a spring biasing said arm away from said stack;

a leaf spring secured at one end thereof to said arm near said pivoted end and resiliently biased toward said stack;

a backstop secured to said frame;

a solenoid actuatable to pivot said arm toward said stack so that said leaf spring presses against said stack and to urge the uppermost cards in the stack against the backstop;

means for removal of a card from the stack;

a drive mechanism for driving said means;

means on said drive mechanism for providing a periodic signal; and

means responding to said periodic signal for periodically energizing the solenoid.

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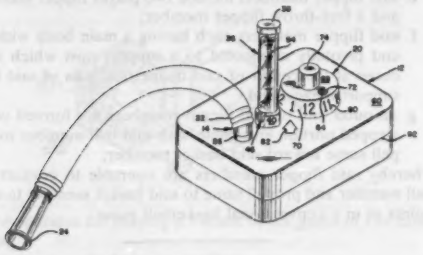
**4,025,070**

## RESPIRATORY EXERCISER

**Lee E. McGill, Albany, and Raymond D. Von Alven, San Raphael, both of Calif., assignors to Cutter Laboratories, Inc., Berkeley, Calif.**

**Filed Apr. 19, 1976, Ser. No. 678,282**
**Int. Cl.² A63B *23/00*; A61B *5/08***
**U.S. Cl. 272—99** **11 Claims**



1. A respiratory exercising device comprising:
a. a closed hollow container,
b. a breathing tube in communication with a first opening located at a first position on said container,
c. variable aperture means for selectively regulating flow of air into said container and located at a second position on said container,
d. a transparent hollow column generally vertically mounted by its base at a third position on said container and having an access opening into said column near the base of said column, said access opening being external of said container,
e. conduit means connected at one end to the upper end of said column and in communication at its other end with a second opening in said container said first opening, said aperture means and said second aperture being in communication within the container; and
f. an air floatable member normally positioned near the bottom of said column above said access opening and adapted for vertical movement within said column in response to flow of air through said access opening on inhaling air through said breathing tube.

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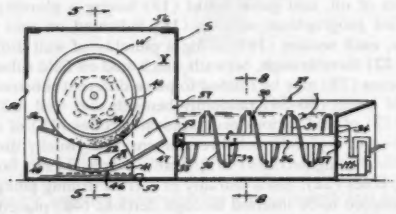
**4,025,071**

## TENNIS BALL SERVER AND COURT INSTALLATION

**Kenneth M. Hodges, 3750 Grandview Blvd., Los Angeles, Calif. 90066**

**Filed Mar. 5, 1976, Ser. No. 664,376**
**Int. Cl.² A63B *61/00***
**U.S. Cl. 273—29 A** **7 Claims**



1. In combination, a tennis ball feeder and server for tennis practice court installation: the feeder including a feed screw disposed below an opening through which conventional tennis balls pass and being disposed on an axis aligned with the direction in which the balls are served by said server, said feed screw having a predetermined radius and being comprised of a center shaft to support said conventional tennis balls advancing and a helical rod having a radius greater than that of said balls, a pair of upstanding spaced apart and parallel rails enclosing said feed screw, one of said rails being positioned counterclockwise and the other being positioned clockwise as related to the direction of feed screw rotation, said rails being disposed relative to each other a distance greater than said predetermined radius of the feed screw, and drive means motivating the feed screw to revolve clockwise, the feed screw being of right hand pitch to engage balls dropped through said opening defined by said spaced apart rails to advance the same along said shaft thereof; the server including an inertia wheel supported on a transverse axis overlying a rail concentric therewith and aligned with the said feed screw to receive balls delivered sequentially therefrom, to engage said balls said rail having entry and exit portions extended tangentially therefrom to receive and to emit said balls upon engagement by said wheel.

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**4,025,072**

## SPORT RACKET FRAME AND APPARATUS FOR PRODUCING SAME

**Robert W. Eshbaugh, 533 Davisville Road, Willow Grove, Pa. 19090**

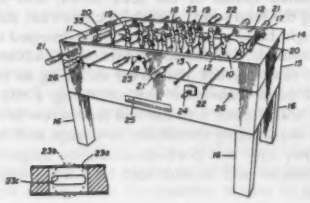
**Continuation of Ser. No. 341,525, March 15, 1973, abandoned, which is a continuation of Ser. No. 868,780, Oct. 23, 1969, abandoned. This application Dec. 30, 1974, Ser. No. 537,375**
**Int. Cl.² A63B *49/10***
**U.S. Cl. 273—73 F** **13 Claims**

1. A racket frame having a tensile and compressive strength in excess of 80,000 pounds per square inch defining an annular head portion for receiving a stringing, a throat and a neck portion and a solid handle portion extending from said neck portion, said frame being a laminated structure made up of a plurality of layers of material integrally bonded to each other by a hardened bonding agent, at least one of said layers constituting a continuous filamentary windable material which forms a closed loop whose configuration defines solely the inner periphery of said head and throat portions, and other of said layers also constituting a continuous filamentary windable material and a closed loop which in tensioned condition extends about the outer periphery of said loop of said head and away therefrom at said neck to form said handle portion.

## 4,025,073
## TABLE SOCCER OR FOOTBALL GAME STRUCTURE

Robert L. Furr, and Robert I. Hayes, Jr., both of 4215 Oak Lawn Ave., Dallas, Tex. 75219

Division of Ser. No. 370,915, June 18, 1973, Pat. No. 3,926,432. This application Nov. 5, 1975, Ser. No. 629,002
Int. Cl.[2] A63F 7/06
U.S. Cl. 273—85 D 9 Claims



1. A table soccer or football game structure comprising:

a top housing unit having a playing field portion surrounded by raise opposite side walls and end walls, said end walls each having a goal opening therein, a plurality of actuating rods extending through said opposite side walls spaced transversely and above said playing field portion and supporting game figures thereon depending adjacent said playing field portion and adapted to contact a ball thereon, said actuating rods being rotatively and axially movable relative to said side walls; and

a ball drop opening extending through said side wall, said opening having a groove formed in the lower central portion for supporting a ball in a stationary position for being spun through the hole and onto the playing surface with a select motion bias to start the game.

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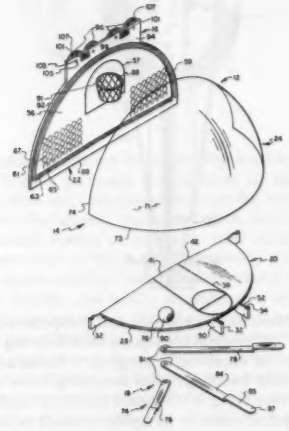
## 4,025,074
## MINI-DOME BASKETBALL GAME

Leon R. Hodges, 1656 Ellis, Wichita, Kans. 67211

Filed Aug. 22, 1975, Ser. No. 606,852
Int. Cl.[2] A63F 7/00
U.S. Cl. 273—101 4 Claims



1. A basketball game structure used by two or more persons to simulate the playing of a basketball game, comprising:

a. a main enclosure means to rest on a support surface and having an actuator means associated therewith;

b. said main enclosure means having a basic support means and a backstop means extended perpendicular thereto; and a dome means connected to said backstop and said basic support means to define a game playing area;

c. said actuator means having flipper members connected to said basic support means; a basket member connected to said backstop means; and a ball member mounted within said playing area;

d. said basic support means having a semi-circular shaped first floor member with a diametrical axis elevated above the semi-circular edge of said first floor member whereby said ball member is actuated under the force of gravity to move toward said semi-circular edge;

e. said flipper members include two player flipper members and a free-throw flipper member;

f. said flipper members each having a main body with one end pivotally connected to a support post which is secured at the center of said diametrical axis of said basic support means; and

g. an outer end of said flipper members are formed with a stepped portion engagable with said ball member to propell same toward said basket member;

whereby said flipper members are operable to contact said ball member and propell same to said basket member to score points as in a conventional basketball game.

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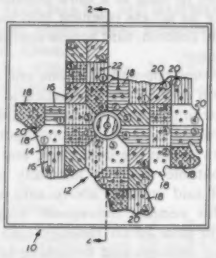
## 4,025,075
## WILDCAT OIL WELL DRILLING GAME

Martin T. Priska, Miami, and Russell V. Ringquist, Coral Gables, both of Fla., assignors to Gustave Miller; Martin T. Priska, both of Miami and Russel V. Ringquist, Coral Gables, all of, Fla.

Filed July 15, 1975, Ser. No. 596,064
Int. Cl.[2] A63F 3/00
U.S. Cl. 273—135 AB 5 Claims



1. A wildcat oil well drilling game comprising a three dimensional game board (10) having a representation of a geographical oil field area (12) thereon, said game board (10) having a three dimensional oil field substratum means (28) mounted for rotation about a fixed vertical axis in said game board therewithin beneath its top surface (16), said oil substratum means (28) having a multiplicity of various levels (30–36) representing different quantities or absence of drillable amounts of oil, said game board (10) having a plurality of identified geographical sections (18) indicated on said top surface, each section (18) having a plurality of well drilling holes (22) therethrough, beneath which said oil field substratum means (28) may be rotated to place different substratum oil field levels (30–36) randomly beneath said well drilling holes (22) of said various geographical sections (18) of said game board, a plurality of three dimensional visually distinguishable drilling derricks (40) placable over said game board drilling holes (22), and a plurality of derrick drilling plungers (44) adapted to be inserted through derricks (40) placed on said game board (10), said drilling plungers (44) each having indicia thereon indicating the depth the said plunger (44) is inserted, identifying the substratum level it has reached when inserted and chance means (48) for selecting the section (18) where a player may locate his derrick (40), said chance means comprising a chance spinner (50) and a wheel (52) having

indicia (**54, 55**) corresponding to the indicia (**16, 20**) on said sections (**18**).

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**4,025,076**

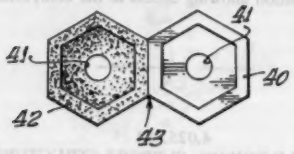
## GEOMETRIC GAME PIECES

**Edwin A. Lipps, 205 Chautauqua Ave., Pacific Palisades, Calif. 90272**

**Continuation-in-part of Ser. No. 481,305, June 20, 1974, abandoned. This application Aug. 13, 1975, Ser. No. 604,250**

**Int. Cl.² A63F** *3/00*

**U.S. Cl. 273—137 R** **2 Claims**




1. Apparatus for playing a variant of the game of Go, comprising:

a plain unmarked playing surface;

a set of pieces playable on said surface and all of the same shape and size,

each said piece being shaped substantially as a short polygonal prism,

the shape of said prism permitting a plurality of pieces to form a mosaic wherein no vertex of one prism lies on a side of another;

end surface portions of each said piece being of one of two different colors but bearing no other distinctive markings;

pick-up means in the end surface portion of each said piece, and

a pick-up tool engageable with any of said means to lift a piece axially upward out of said mosaic;

the section of said prism being in the shape of two regular polygons joined along a common side to define a dual piece of two halves,

each said half being of a different one of said two colors,

said pick-up means being provided in the central portion of each said half; and

said two regular polygons being hexagons.

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**4,025,077**

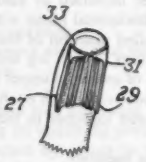
## GOLF SHAFT GRIPPING DEVICE

**Homer T. Thompson, 1821 Muse, Fort Worth, Tex. 76112**

**Filed Jan. 26, 1976, Ser. No. 652,136**

**Int. Cl.² A63B** *71/14*

**U.S. Cl. 273—166** **5 Claims**




1. A device for use for preventing a golf shaft from twisting about its axis in the course of a swing by a player, comprising:

flexible gripping means having a given length and width,

said flexible gripping means comprising two wedge shaped portions extending along the length thereof,

said wedge shaped portions as seen in a plane perpendicular to the length of said flexible gripping means, tapering generally toward the central portion of the width of said flexible gripping means such that said central portion has a thickness less than the thickness of the outer edges of said wedge shaped portions,

said flexible gripping means having a top side adapted to be attached to the underside of the thumb section of a golf players glove with the length of said flexible gripping means extending along the length of the thumb section of the glove,

said flexible gripping means having a bottom side defined in part by the bottom sides of said wedge shaped portions for engaging a golf shaft,

the bottom sides of said wedge shaped portions as seen in a plane perpendicular to the length of said flexible gripping means, extending from the outer edges thereof upward toward said central portion such that said bottom side of said flexible gripping means may be fitted partially around a golf shaft.

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**4,025,078**

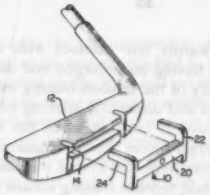
## ATTACHMENT FOR A GOLF CLUB

**David T. Pelz, 13129 Oriol Drive, Beltsville, Md. 20705**

**Continuation-in-part of Ser. No. 490,909, July 22, 1974, Pat. No. 3,912,277. This application May 23, 1975, Ser. No. 580,243**

**Int. Cl.² A63B** *69/36, 53/06*

**U.S. Cl. 273—186 A** **4 Claims**




1. A unitary attachment for use with a golf club head having a ball striking face with an effective center of percussion on said face and recess means on said golf club head for receiving said attachment integrally with said club head, said attachment having a predetermined mass including an elongated bar-like body portion of a generally rectangular configuration and spaced elements attached to opposite ends of said body portion and being perpendicular thereto, said spaced elements being generally L-shaped, each having a horizontal leg and a vertical leg, said horizontal leg being attached to said body portion and said vertical leg extending beyond said body portion and generally at right angles to said body portion, and projecting outwardly from said body portion and forwardly of said ball striking face when mounted on said club head receiving means to thereby form a restricted practice target area on said ball striking face and coupling means for securing said attachment to said club head receiving means.

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**4,025,079**

## TRACTION MOTOR SUSPENSION BEARING LUBRICATION

**Richard J. Renk, and George E. Boller, both of Winona, Minn., assignors to Gladys D. Miller, Winona, Minn.**

**Division of Ser. No. 351,176, April 16, 1973, Pat. No. 3,905,659. This application Oct. 29, 1974, Ser. No. 518,475**

**Int. Cl.² F16J** *9/18*

**U.S. Cl. 277—220** **6 Claims**

1. A lubricant seal ring for clamping around a shaft and in a groove area of a bearing which when unrestrained is adapted to be rotated by said shaft so as to move lubricant from said groove area to drain means operatively connected to said groove area comprising,

a flexible, semi-rigid member adapted to encircle at least a portion of said shaft and being split to have at least two adjacent ends, said member having an outside diameter

surface and an inside diameter surface with the inside diameter surface being shaped to conform to the shaft,

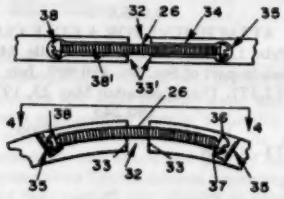
said member having a recessed channel-type slot projecting inwardly from the outer diameter surface and extending through the tip of at least one of said ends, said slot terminating inwardly away from an end in a flared opening wider and deeper than said slot, said slot being curved to somewhat follow the curvature of the member,

said flared opening tapering downwardly and inwardly from a point adjacent the outside diameter surface of said member toward the inside diameter surface thereof at an angle to said slot to provide an under-cut effect with the top of the sidewall of the opening overhanging the bottom of the opening, and

tension biasing means positioned in said slot bridging between the ends of said member acting to urge said member inwardly into contact with said shaft, said biasing means having an enlarged end area which is wider than the body of the tension biasing means and extends into a tapered and under-cut opening to retain the tension biasing means in position when the member is subjected to centrifugal forces during rotation,

said channel-type slot in said member being deep enough to allow said tension biasing means including said end area to be recessed below the outside surfaces of said member,

said tension biasing means following the curvature of the recessed slot within the member and being of sufficient tension to cause said member to rotate with said shaft but yet allow said member to be cammed from side to side along the shaft to provide a self-centering action if the member engages the side walls of the groove area and also provide a slip-clutch effect to allow said member to slip on said shaft if the member is restrained from moving.

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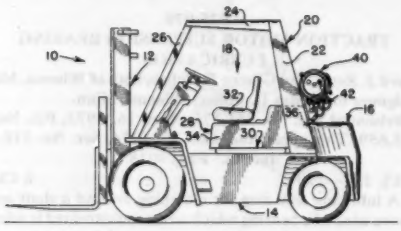
**4,025,080**

## MOVABLE FUEL TANK MOUNT

Nelson J. Gedeon, Aurora, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Filed Jan. 19, 1976, Ser. No. 650,223
Int. Cl.² B60P 3/22
U.S. Cl. 280—5 A 3 Claims




1. A pivotal fuel tank mount, for a vehicle having a compartment with a serviceble component therein and an operator protecting frame having a pair of upstanding support legs juxtaposed at either side of the compartment, comprising:

a fuel tank;

a assembly for supporting the fuel tank, the cradle assembly having opposite ends;

a pivot and support assembly connected to one of the legs of the protecting frame for supporting one end of the cradle assembly; and

a latching mechanism and support assembly connected to the other one of the legs of the protecting frame for positively holding and supporting the opposite end of the cradle assembly in a normal position bridgingly between the legs, the assemblies being of a construction sufficient for allowing selective swinging movement of the cradle assembly and the fuel tank from the normal position to a service position allowing access to the compartment.

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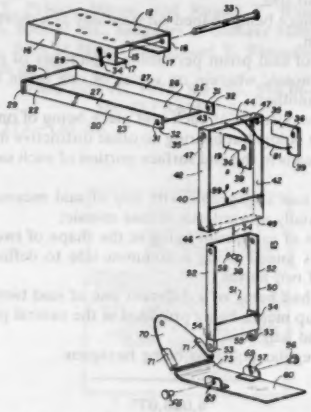
**4,025,081**

## VEHICLE TOWING SUPPORT STRUCTURE

Donald H. Bintz, Wautoma, Wis., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Dec. 29, 1975, Ser. No. 644,723
Int. Cl.² B60S 9/22
U.S. Cl. 280—7.14 4 Claims



1. An assembly of parts for providing an extended leg support to a vehicle on which a ground engaging member may be mounted, comprising

a housing, adaptable for fastening to the frame of a vehicle,

a slidable member mounted in said housing so as to be slidable in the horizontal plane with respect to the housing, in the installed position of the housing,

a pair of leg sections, which leg sections serve in the extended position of use as an upper leg section and a lower leg section respectively, with each of said leg sections of a size to be stored together in the housing, when not in use,

a ground engaging member,

first attachment means selectively connecting the upper leg section to said slidable member at a right angle to said slidable member,

second attachment means selectively connecting said upper leg section to the lower leg section in the same vertical plane,

third attachment means connecting said ground engaging member to the lower leg section,

wherein the apparatus may be stored by disconnecting said first, second and third attachment means and placing at least the leg sections within the slidable member.

## 4,025,082
## ICE BLOCK SLED

J. Frank Lummus, Martinez, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Jan. 23, 1976, Ser. No. 651,895
Int. Cl.² B62B 13/16
U.S. Cl. 280—12 H 4 Claims

1. A sled, comprising

a block of ice having a front, a back, a pair of sides, a bottom surface adapted to slide along a supporting surface and a top surface adapted to accommodate a rider and having depressions formed therein for the heels of the shoes of a rider; and

a cord embedded in the ice and extending from both sides thereof for providing handholds for the rider whereby the rider rests his entire body on the top surface of the block of ice.

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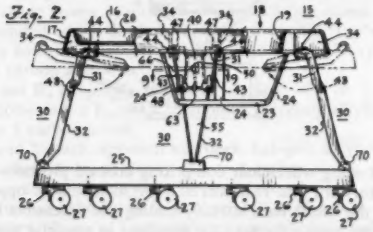
## 4,025,083
## BABY WALKER

David Saint, Elverson, Pa., assignor to Graco Metal Products, Inc., Elverson, Pa.

Filed Sept. 23, 1975, Ser. No. 615,915
Int. Cl.² B62B 7/10
U.S. Cl. 280—87.05 9 Claims



1. A baby walker comprising

a tray having an opening and a seat below said opening,

lug means on said tray,

a base frame, and

legs for supporting said tray from said base frame,

said legs each having an upper leg portion pivotally readily detachably connected by pivots to said lug means and including a central plate engaged by abutments carried on said tray thereby restraining the tray from transverse movement,

a lower leg portion pivotally detachably connected at its upper end to said upper leg portion, pivotally connected at its lower end to said base frame and with a projection for engagement in said central plate to restrain sidewise movement in locked condition,

a resilient locking tongue carried by said lower leg portion for releasably engagement with said central plate for normally retaining said upper and lower leg portions in extended and supporting relation but permitting folding of said legs and movement of said base frame in closely spaced relation to said tray.

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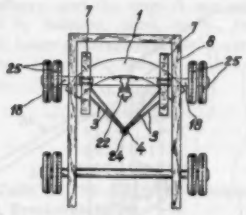
## 4,025,084
## DEVICE FOR SELF-ORIENTATION OF THE AXIS OF VEHICLES, TRAILERS AND SEMI-TRAILERS

Jose Jeronimo Martel Mendez, Concha Espina No. 12, Madrid, Spain

Filed July 25, 1975, Ser. No. 598,939
Claims priority, application Spain, July 27, 1974, 204930; Apr. 29, 1975, 211978
Int. Cl.² B60P 9/00
U.S. Cl. 280—141 8 Claims



1. An improved device for the self-orientation of an axle of a vehicle, comprising first skate means attached to the vehicle, second skate means mounted on the axle, and means interconnecting said first and second skate means to enable horizontal relative movement therebetween and to constrain such movement to an arcuate path; said interconnecting means including a first pair of connecting arms converging from spaced points on said first skate means to a point along the longitudinal center line of the vehicle ahead of the axle in the direction of motion of the vehicle, a second pair of connecting arms converging from spaced points on said second skate means to said center line point, and means pivotally joining said first and second pairs of connecting arms at said center line point for rotation about a vertical axis, the horizontal position of said pivot means being fixed relative to the horizontal positions of said first and second skate means by said first and second pairs of connecting arms independent of the position of the axle relative to the vehicle.

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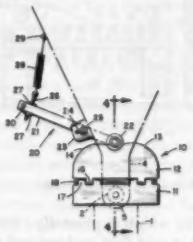
## 4,025,085
## SWAY STABILIZER FOR TRAILING VEHICLES

James Paul Jacobs, Rte. 1-Box 310, Port Lavaca, Tex. 77979

Filed Dec. 31, 1975, Ser. No. 645,647
Int. Cl.² B62D 53/00
U.S. Cl. 280—446 B 15 Claims



1. A device to stabilize the alignment between a towing vehicle and a trailing vehicle comprising a camming assembly mounted on the hitch element of the towing vehicle, one portion of said assembly being adapted for pivotal movement

in a vertical plane relative to the remainder of said assembly, and a pretensioned lever assembly pivotally mounted on the tongue of the trailing vehicle with one end thereof engaging said pivotal portion of said camming assembly.

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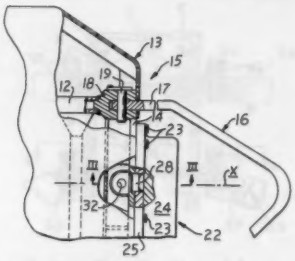
**4,025,086**

## PUSH BLOCK ASSEMBLY WITH SHEAR LOAD TRANSMITTING MEANS

**Jack R. Barr; Thomas E. Hrodey, and Ralph G. Johnson, all of Decatur, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Nov. 3, 1975, Ser. No. 627,568**
**Int. Cl.² B60D** *3/00*
**U.S. Cl. 280—481** **16 Claims**




1. A push block assembly mounted on a frame of a vehicle, the improvement comprising

a push block,

fastening means detachably mounting said push block on said frame,

means forming aligned recesses in said frame and in said push block, and

shear load transmitting means, independent of said fastening means, fixedly secured and closely fitted in said recesses for transmitting shear loads imposed on said push block to said frame.

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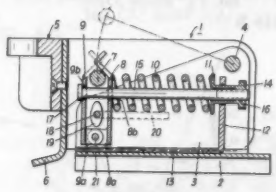
**4,025,087**

## SAFETY SKI BINDING

**Erwin Krob, Vienna; Erwin Weigl, Brunn am Gebirge, and Josef Svoboda, Schwechat, all of Austria, assignors to Gertsch AG, Zug, Switzerland**

**Filed June 27, 1975, Ser. No. 591,032**
**Claims priority, application Austria, July 26, 1974, 6181/74**
**Int. Cl.² A63C** *9/08*
**U.S. Cl. 280—631** **8 Claims**




1. A safety ski binding, comprising:

a first member

a second member which is pivotally connected to said first member so that said first and second members are movable with respect to each other about a pivot axis between a position of use and a release position, said pivot axis extending transversely to the longitudinal direction of a ski;

a pair of spaced track and holding members mounted on said first member, both of said track and holding members being supported for movement relative to each other.

adjustable abutment means mounted on said first member, said adjustable abutment means including an adjustable abutment and connecting means for connecting said adjustable abutment to one of said track and holding members;

resilient means consisting of a single spring engaging and extending between the other of said track and holding members and said adjustable abutment for urging both of said movable track and holding members toward each other;

inclined surface means on at least one of said track and holding members and positioned between said pair of track and holding members and having means defining a threshold part thereon; and

locking pin means secured to said second member and positioned between said pair of track and holding members and to engage said inclined surface means at a location spaced from said threshold part when said sole holder is in said position of use, a movement of said sole holding part toward said release position effecting a separation of said pair of track and holding members upon a movement of said locking pin means past said threshold part, said single spring resisting the separation movement of both of said track and holding members.

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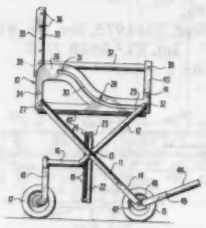
**4,025,088**

## FOLDING WHEELCHAIR

**Barbara G. Rothschild, 2134 Springdale Drive, Columbus, Ga. 31906**

**Filed Apr. 13, 1976, Ser. No. 676,560**
**Int. Cl.² B62B** *7/08*
**U.S. Cl. 280—644** **11 Claims**



1. A folding wheelchair comprising crossed pivotally connected forward and rear wheeled leg members at opposite sides of the wheelchair, laterally folding and extensible interconnecting means for said leg members at opposite sides of the chair and extending therebetween laterally of the chair, whereby the opposite side leg members may be separated laterally to open the chair for use and moved together laterally to collapse the chair to a non-use laterally narrow form, a chair seat including substantially vertical side plates having inclined cam track means, for guiding the movement of the upper ends of the rear leg members corresponding end portions of the side plates pivoted to corresponding upper ends of the forward leg members at opposite sides of the chair, corresponding upper ends of the rear leg members at opposite sides of the chair being movably engaged with said inclined cam track means of said side plates, whereby folding of the crossed leg members at opposite sides of the chair to collapse the chair fore and aft will force said side plates and chair seat to pivot downwardly to a near vertical position between and substantially within the confines of said forward and rear leg members at the opposite sides of the chair, and interconnected independently foldable back and arm rest means pivotably mounted on said side plates, whereby the back and arm rest means may fold forwardly and downwardly between and substantially

within the confines of the side plates and opposite side leg members.

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**4,025,089**

## PRESSURE-SENSITIVE COPYING OR RECORDING MATERIAL

**Robert Garner, Ramsbottom Bury, England, and Jean-Claude Petitpierre, Kaiseraugst, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

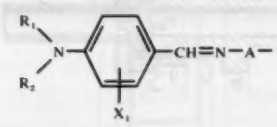
**Filed Aug. 3, 1976, Ser. No. 711,195**

**Claims priority, application Switzerland, Aug. 12, 1975, 10466/75**

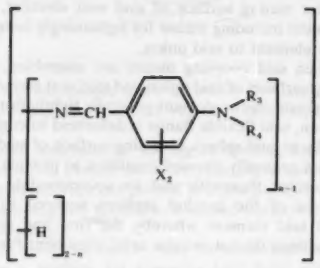
**Int. Cl.² B41M** *5/22*

**U.S. Cl. 282—27.5** **13 Claims**

**1.** Pressure-sensitive copying or recording material which contains, in its colour-producing system, as the colour former, at least one azomethine compound of the formula



(1)



wherein

$R_1$, $R_2$, $R_3$ and $R_4$ each represent hydrogen, alkyl of 1 to 4 carbon atoms, cyanoalkyl of 2 to 5 carbon atoms, unsubstituted benzyl or phenyl, or benzyl or phenyl substituted by halogen, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms, or

$R_1$ and $R_4$ conjointly represent alkylene of 4 or 5 carbon atoms and/or $R_3$ and $R_4$ conjointly represent alkylene of 4 or 5 carbon atoms,

$X_1$ and $X_2$ each represent hydrogen, halogen, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms,

A represents naphthylene or phenylene which is unsubstituted or substituted by halogen, alkyl of 1 to 5 carbon atoms, alkoxy of 1 to 4 carbon atoms, phenoxy, halogenophenoxy or acylamino of 1 to 9 carbon atoms, and $n$ is 1 or 2.

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**4,025,090**

## PRESSURE-SENSITIVE OR HEAT-SENSITIVE RECORDING MATERIAL

**Jean-Claude Petitpierre, Kaiseraugst, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

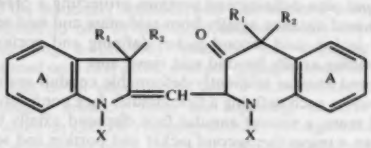
**Filed Sept. 9, 1976, Ser. No. 721,916**

**Claims priority, application Switzerland, Oct. 8, 1975, 13070/75**

**Int. Cl.² B41M** *5/22*

**U.S. Cl. 282—27.5** **15 Claims**

**1.** A pressure-sensitive or heat-sensitive recording material which contains as colour former at least one tetrahydroquinoline compound of the formula



(1)

wherein each of

$R_1$ and $R_2$ represents lower alkyl, cycloalkyl or benzyl or together represent alkylene, and

X represents alkyl of at most 12 carbon atoms which is unsubstituted or substituted by halogen, hydroxyl, cyano, lower alkoxy or lower alkoxycarbonyl, or benzyl which is unsubstituted or substituted by halogen, nitro, lower alkyl or lower alkoxy, and the rings A are unsubstituted or substituted by halogen, nitro, cyano, trifluoromethyl, lower alkyl, lower alkoxy, lower alkoxycarbonyl, phenyloxy, amino, lower alkylamino or N-lower alkylcarbonylamino.

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**4,025,091**

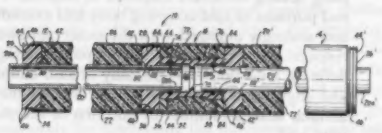
## CONDUIT SYSTEM

**George David Zeile, Jr., Medina, Ohio, assignor to Ric-Wil, Incorporated, Brecksville, Ohio**

**Filed Apr. 30, 1975, Ser. No. 573,123**

**Int. Cl.² F16L** *59/16*

**U.S. Cl. 285—53** **1 Claim**



**1.** In a conduit system wherein a plurality of conduit units are laid end to end with adjacent ends of the conduit units coupled together and sealed:

a. first conduit unit comprising:

i. a length of pipe;

ii. a tubularly configured mass of insulating material extending circumferentially about said pipe and axially therealong;

iii. a sleeve-like conduit jacket extending circumferentially about said mass and axially therealong, said pipe defining end portions projecting a predetermined distance axially from said mass and said conduit jacket, said conduit jacket defining end portions extending axially beyond said mass; and,

iv. annular resiliently deformable conduit sealing members each defining a first annular face confronting said mass, a second annular face disposed axially between a respective conduit jacket end portion and pipe end portion, an inner peripheral portion sealingly engaged with said pipe and an outer peripheral portion extending axially between said first and second faces and defining outwardly projecting circumferential ribs deformed by and sealingly engaged with the interior of said jacket axially between said mass and the respective jacket end portion and outwardly projecting circumferential ribs disposed axially between the respective jacket end portion and said second face;

b. a second conduit unit comprising:

i. a second length of pipe;

ii. a second tubularly configured mass of insulating material extending circumferentially about said pipe and axially therealong;

iii. a second sleeve-like conduit jacket extending circumferentially about said mass and axially therealong, said

second pipe defining end portions projecting a predetermined distance axially from said mass and said second jacket, said second jacket defining end portions extending axially beyond said mass; and

iv. second annular resiliently deformable conduit sealing members each defining a first annular face confronting said mass, a second annular face disposed axially between a respective second jacket end portion and second pipe end portion, an inner peripheral portion sealingly engaged with said second pipe, and an outer peripheral portion extending between said first and second faces and defining outwardly projecting first circumferential ribs deformed by and sealingly engaged with said second conduit jacket axially between said mass and the respective jacket end portion and outwardly projecting second circumferential ribs disposed axially between the respective second jacket end portion and said second face; and,

c. a coupling unit disposed between said first and second conduits comprising:

i. a tubular coupling body member having opposed end portions extending about adjacent projecting end portions of said first and second pipes;

ii. pipe engaging seals disposed radially between said coupling body end portions and said pipe end portions;

iii. a tubularly configured mass of insulating material extending about said coupling body and axially therealong throughout a portion of the axial length of said coupling body, said coupling body end portions extending axially from said insulating material;

iv. first and second annular resiliently deformable coupling sealing members disposed at respective opposite end portions of said coupling body and extending about and sealingly engaged with the outer periphery of the respective end portions, each coupling sealing member defining a portion facing axially of said coupling body and engaging a respective second face of the adjacent annular sealing member of said first or second conduit unit; and,

v. a sleeve-like coupling unit jacket extending about said coupling body member and said first and second annular coupling sealing members, said coupling jacket defining projecting end sections extending axially beyond said coupling sealing members, each coupling jacket end portion defining a substantially circumferentially continuous cylindrical peripheral inner surface;

d. opposed ends of said coupling unit jacket disposed in confronting relationship with the ends of said respective first and second conduit jackets and said peripheral cylindrical coupling jacket surfaces deforming and sealingly engaging said circumferential ribs of the adjacent conduit unit sealing member so that the first and second circumferential ribs are disposed on opposite axial sides of the confronting coupling and conduit unit jackets, said conduit sealing members extending into said respective coupling jacket end portions and the location of engagement of said coupling and conduit sealing members spaced axially from said confronting conduit and coupling jacket ends.

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**4,025,092**

## SELF-ALIGNING DETACHABLE FITTING

**Fancher B. Wakefield, E. Northport, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.**

**Continuation-in-part of Ser. No. 389,504, Aug. 20, 1973, abandoned. This application Dec. 2, 1974, Ser. No. 528,699**

**Int. Cl.² F16L** *7/00*

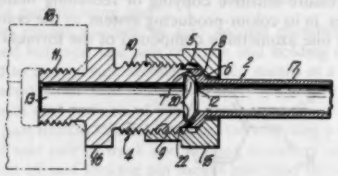
**U.S. Cl. 285—94** **5 Claims**

1. Coupling means capable of connecting two sections of a high pressure fluid-carrying conduit, which comprise:

a seat element having one end adapted to be secured to and to form a continuation of a first conduit section to be coupled, and having a flange formed on its other end, said flange having a substantially concave interior spherical sealing surface and a generally convex exterior spherical mating surface;

a union having one end adapted to be secured to and to form a continuation of a second conduit section to be coupled, and an indentation in its inner surface substantially near its other, free end, said indentation defining a flexible flange extending radially inwardly of the outer surface of said union, said flexible flange having an essentially conical sealing surface adapted to sealingly engage the interior spherical sealing surface of said seat element and to deform for substantially complementary engagement therewith; and

a sleeve element having a generally concave interior spherical mating surface adapted to engage and bear against



said exterior mating surface of said seat element, said sleeve element including means for tighteningly fastening said sleeve element to said union,

such that when said coupling means are assembled, with said sealing surfaces of said union and said seat element in contact and said sleeve element generally tightly fastened to said union, said flexible flange is deformed to conform substantially to said spherical sealing surface of said seat element in a generally stressed condition to provide sealing engagement therewith and to accommodate axial misalignment of the conduit sections secured to said union and said element whereby the first and second conduit sections do not require axial alignment for coupling.

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**4,025,093**

## PIPE COUPLINGS AND SPLIT RINGS USED THEREIN

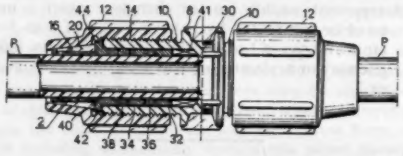
**Moshe Leczycki, Tel Aviv, Israel, assignor to Plasson Maagan Michael Industries Limited, Menashe, Israel**

**Filed Sept. 30, 1975, Ser. No. 618,281**

**Claims priority, application Israel, July 4, 1975, 47642**

**Int. Cl.² F16L** *21/04*

**U.S. Cl. 285—343** **5 Claims**



1. A pipe coupling comprising a housing formed with external threads and with an internal axial bore for receiving one end of a pipe; a one-piece split-ring of hard elastic material for application around the pipe to be received in the bore of the housing, said split-ring having an outer tapered surface and an inner surface formed with annular teeth; and a sleeve formed at one end with threads cooperable with the threads of the housing, and formed at the opposite end with an internal conical surface engageable with the outer tapered surface of the split-ring to cause the split-ring to tightly clamp the pipe upon threading the sleeve onto the housing; characterized in that said split-ring has sufficient axial elasticity to enable it to be opened sufficiently wide along the slit and to be applied in a radial direction to the pipe after the latter has been inserted

into the bore of the housing, said split-ring being constituted of a wall having an axially-extending slit and a plurality of circumferentially-spaced, axially-extending ribs of increasing height, the circumferential spacing between adjacent ribs being greater than the width of the ribs, the outer tapered surface of the split-ring being defined by the top lands of said ribs.

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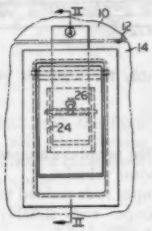
**4,025,094**

## OVERCENTER LATCH

**Thomas L. Mitchell, Washington, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Feb. 25, 1976, Ser. No. 661,089**
**Int. Cl.² E05C *3/04***
**U.S. Cl. 292—87** **4 Claims**




1. An overcenter latch assembly for latching a movable closure member to a fixed wall member comprising in combination:

a fixed wall member having an opening defined therein;

a movable closure member pivotally secured to said fixed wall member and pivotal to a first position for closing said opening and pivotal to a second position for clearing said opening;

latch means carried by said movable member and movable to a position for engaging said fixed wall member for retaining said pivotal wall member into position in said opening, said latch means comprising:

a handle member having a generally flat rectangular configuration, said handle member pivotally mounted at one end to said movable closure member adjacent a plane defined thereby;

an arm member formulated of spring material secured at one end to said handle member and extending generally along said handle to another end located beyond the pivotal mounting of the handle to the movable closure member;

adjustable means mounted on said other end of said arm member for adjustably engaging the fixed wall member and setting up an adjustable spring tension in said arm member when said latch means retains said pivotal closure member in said first position;

a cavity defined by wall means of said closure member for receiving said handle member; and

an overcenter tension member pivotally connected at one end to said wall means of said closure member intermediate said pivotal mounting of said handle member to said movable closure member and said arm member and pivotally connected at the other end to said arm member.

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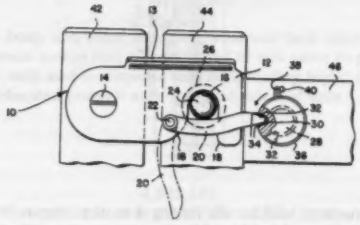
**4,025,095**

## LATCH APPARATUS

**Joe Hausladen, Santa Rosa, Calif., assignor to Lawrence Peska Associates, Inc., New York, N.Y.**

**Filed Aug. 3, 1976, Ser. No. 711,311**
**Int. Cl.² E05C *19/12***
**U.S. Cl. 292—108** **5 Claims**

1. Latch apparatus for use in combination with a hinged door and a stationary member, comprising first and second cooperating assemblies adapted to be mounted to the door and the stationary member, said first assembly adapted to be mounted to one of said door and stationary members and comprising a pivotally mounted pin engaging member mounted on a first pivot, said pin engaging member having an opening in an edge thereof and a recessed section therein extending inwardly from said opening, an arm pivotally mounted on said pin engaging member through a second pivot and adapted to swing over said opening in said pin engaging member, said arm extending beyond said opening for engagement by said second assembly, said second assembly adapted to be mounted to the other of said door and stationary member and comprising a pin member adapted to be received by said recessed section in said pin engaging member, said second assembly also comprising a knob for rotatably mounting on the other of said door and stationary members, a detent extending inwardly from an opening in the periphery of said knob for engaging the end of said arm when said recessed section engages said pin member, a torque loadable resilient member operatively connected to said knob for applying a return torque to said knob when it is rotated from a position engaging and holding said arm over said opening to a position for releasing said arm by pivoting away from said opening, retaining means on said second assembly operatively engaging said first assembly for preventing the movement of said latch in the direction of the longitudinal axis of said first pivot when said arm is swung over said opening and is engaged by said detent in said knob.

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**4,025,096**

## LATCH MECHANISM FOR CABINET CLOSURE MEANS

**Larry A. Geer, Upland, Calif., assignor to Adams Rite Products, Inc., Glendale, Calif.**

**Filed Dec. 24, 1975, Ser. No. 644,299**
**Int. Cl.² E05C *1/06***
**U.S. Cl. 292—158** **4 Claims**

1. Mechanism for removably attaching a closure member to the front of a cabinet, comprising:

a. a frame structure adapted for surface mounting on an outer surface of a cabinet closure member;

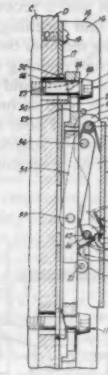
b. latching means carried by said frame structure and being supported for rectilinear movements between a non-latching position and a latching position with respect to fixed keeper means on said cabinet, said latching means including:

coacting camming surfaces responsive to movement of said latching means to its latching position to generate a high loading force of engagement between the closure member and the cabinet,

a latching bar having one of said camming surfaces formed thereon, and

a camming member comprising a removably mounted insert on said frame structure having the other camming surface formed thereon; and

c. actuator means for said latching means including a manually operable handle swingably mounted on said frame



structure, said handle having a motion transmitting connection with said latching means.

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**4,025,097**

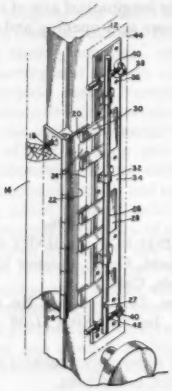
**SECURITY LOCK LATCH**

**Sanford Greenberg, 33 Wilk Road, Edison, N.J. 08817**

**Filed Dec. 3, 1975, Ser. No. 637,212**

**Int. Cl.² E05C** *3/04*

**U.S. Cl. 292—207** **5 Claims**



1. A security latch for use with a door pivotably mounted to one side of a door frame comprising an elongated hinge comprised of two portions pivotally connected to each other, one said portion mounted to the other side of the door frame, one edge of the other portion of said hinge having a plurality of projections with at least one notch; a bolt slidable on the door parallel to the axis of the hinge, the bolt being provided with pressure fingers to engage the projections on the other portion of said hinge when the bolt is in one position, and to clear said porjections and be moveable through the notch when the bolt is slid to an alternate suitable position, upper and lower locking fingers to retain the bolt in respective positions; the combination of the hinge, the bolt, and bolt retention means restricting hinge motion of said other portion and thereby providing a latch restricting door motion.

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**4,025,098**

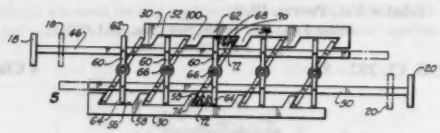
**BUMPER ASSEMBLY FOR A MOTOR VEHICLE**

**Tadeusz Powaska, 166 Adelaide Ave. E., Oshawa, Ontario, Canada**

**Filed May 22, 1975, Ser. No. 579,974**

**Int. Cl.² B60R** *19/02*

**U.S. Cl. 293—30** **4 Claims**



1. A bumper assembly for a motor vehicle, which comprises:

a. a forward bumper:

b. a rear bumper;

c. a pair of channel bar members adapted to be received on a frame of said motor vehicle;

d. a pair of first bumper rods welded to said forward bumper, said first bumper rods slidably contained in said channel bar members;

e. a pair of second bumper rods welded to said rear bumper, said second bumper rods slidably contained in said channel bar members;

f. a plurality of first gear teeth contained on a top surface of said second bumper rod;

g. a plurality of second gear teeth contained on a bottom surface of said first bumper rod;

h. a plurality of first spaced stop elements extending upwardly from a top surface of said first bumper rod;

i. a plurality of second spaced stop elements extending downwardly from a bottom surface of said second bumper rod;

j. a plurality of first stop members extending downwardly from a top interior surface of said channel member, one said first stop element positioned between each two said first stop members;

k. a plurality of second stop members extending upwardly from a bottom interior surface of said channel member, one said second stop element positioned between each two said second stop members; and

l. a plurality of ratchet wheels rotatably contained within said channel bar member, each said ratchet wheel engaging said first and said second gear teeth.

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**4,025,099**

**WHEELED CART WITH CABLE PROTECTION ATTACHMENT**

**Herbert H. Virden, 6533 High Drive, Shawnee Mission, Kans. 66208**

**Filed Jan. 2, 1976, Ser. No. 646,260**

**Int. Cl.² B60R** *19/00;* **B60B** *33/00;* **B62B** *5/00*

**U.S. Cl. 293—58** **3 Claims**

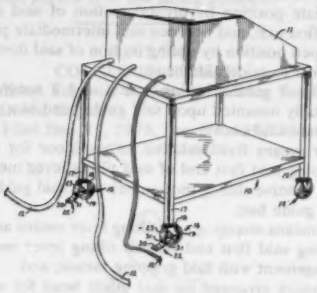
1. In a wheeled cart having a wheel yoke supported to swivel about a substantially vertical axis, a wheel mounted on the yoke to swivel therewith, and a substantially horizontal axle on which the wheel is mounted for rotation, the combination therewith of:

a fender comprising a thin strip having an upper end portion and a lower end portion with said upper end portion being secured directly to the wheel yoke, said fender being spaced forwardly of the wheel;

at least one rigid brace having opposite ends respectively secured to said axle and to said fender in proximity to the lower end portion thereof; and

a cable lifting plate connected at one end to said fender at

the lower end portion thereof for free pivotal movement about a substantially horizontal pivot axis with the weight of said plate urging same downwardly about said pivot axis in a manner to position a leading end of said plate in



yieldable contact with the floor surface on which the wheel travels, said plate having an upper surface for receiving and lifting a cable from the floor surface out of the way of the wheel.

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**4,025,100**

## SYNTHETIC FIBER SLING CONSTRUCTION

**Scott Bridgehouse, Lancaster, Pa., assignor to Lift-All Company, Inc., Manheim, Pa.**

**Filed Mar. 1, 1976, Ser. No. 662,601**
**Int. Cl.² B66C 1/12**
**U.S. Cl. 294—74** **4 Claims**

1. A sling for use with hoisting equipment, comprising a length of fabric webbing having means forming a loop or bight at each end thereof, said fabric webbing comprising a three-ply fabric construction having in each ply weft components and chain warps interconnecting said components to form a self-sustaining fabric construction therein, load-carrying warps extending along the length of the fabric between said plies on opposite sides of the central ply, said load-carrying warps being integrated with the plies on opposite sides thereof by connecting binder warps, each binder warp being interwoven with one ply at the surface of said webbing by passing around a weft component in said one ply and with the central ply by passing around a weft component in said central ply whereby said binder warp is confined to only two of said three plies, each of said binder warps, said weft components and said load-carrying warps being a rigid, continuous-filament synthetic yarn, each of said chain warps being a textured, multifilament synthetic yarn.

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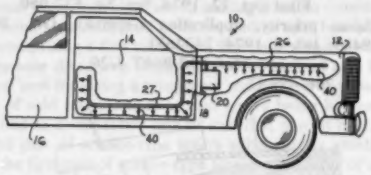
**4,025,101**

## VEHICLE BODY INCLUDING RUSTPROOFING MEANS

**Paul E. Hensel, Jr., 915 Beverly Court, Eastlake, Ohio 44094**

**Filed Sept. 29, 1976, Ser. No. 727,856**
**Int. Cl.² B60R 27/00**
**U.S. Cl. 296—1 R** **1 Claim**

1. Apparatus for rustproofing a selected area of a vehicle body comprising a tank mounted on said vehicle body for storing a quantity of rustproofing liquid, means connected to said tank for distributing said rustproofing liquid to said selected area of said vehicle body, means operatively associated with said tank for transferring said liquid from said tank to said distributing means said means for distributing comprising conduit means disposed along the interior side of the vehicle body and adjacent said selected area, said conduit means having a plurality of perforations corresponding to said selected area and through which said liquid is dispensed onto said area, and a readily accessible tire valve mounted on the



vehicle body and communicating with said tank whereby air compressor means may be connected to said valve to pressurize said tank and to dispense said rustproofing liquid through said perforated conduit and onto said selected area.

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**4,025,102**

## VEHICLE AND CAMPER ASSEMBLY

**Phillip L. Hiles, Rte. 1, Box 77, Andrews, Ind. 46702**

**Filed Oct. 8, 1975, Ser. No. 620,568**
**Int. Cl.² B60P 3/34**
**U.S. Cl. 296—23 MC** **4 Claims**

1. In combination with a self-propelled vehicle comprising a body having front and rear ends and including a front-facing windshield assembly having a top edge, side door assemblies rearwardly of said windshield assembly and respectively on opposite sides thereof, said door assemblies respectively having top edges and rear edges, said door assembly top edges being generally extensions of said windshield assembly top edge, side walls respectively extending rearwardly from said rear edges of said door assemblies to said rear end and having top edges, the height of said side walls being substantially less than that of said door assemblies, a floor extending rearwardly between said door assemblies and side walls to said rear end, and an operator's seat on said floor adjacent one of said door assemblies, said windshield and door assemblies, side walls and floor defining a compartment extending continuously rearwardly between said door assemblies and side walls from said windshield assembly to said rear end and having an open top bounded by said edges; a camper body module removably supported on said vehicle body and comprising side walls respectively having edges sealingly engaging said door assembly and body side wall edges and extending upwardly therefrom, a top wall joining said camper side walls, a front wall joining said top wall and camper side walls and having an edge sealingly engaging said windshield assembly top edge, and a rear wall joining said top wall and camper side walls, said camper walls defining an upward extension of said compartment which extends continuously rearwardly between said camper side walls from said front wall to said rear wall thereby providing an uninterrupted space extending upwardly between said door assemblies and side walls to said top wall and rearwardly to said rear wall from said windshield assembly and front wall.

4,025,103

## PANE COVER DEVICE, PARTICULARLY FOR WINDSHIELDS AND WINDOWS OF MOTOR VEHICLES

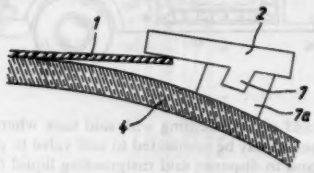
Wolfgang Eichstaedt, Brunnenweg 18, 3331 Bad Helmstedt, Germany

Filed Oct. 22, 1974, Ser. No. 517,050

Claims priority, application Germany, Oct. 26, 1973, 7338489; July 8, 1974, 2432651

Int. Cl.² B60T 1/20

U.S. Cl. 296—95 C 9 Claims




1. A pane cover, particularly for windshields and windows of motor vehicles, comprising:

a covering sheet comprised of stretchable material, with said covering sheet being of a standard size so as to fit any window glass area shape;

at least one reinforcement bar at each of the two opposite sides of said sheets, said each bar comprising closed contour slits for interlacing said cover into said reinforcing bar; and

fastening means, fashioned on each of said reinforcement bar, for fastening the bar to the window glass area, said fastening means comprising a projecting portion extending the length of the respective reinforcement bar and a counterpart portion attached to the vehicle for frictionally inserting said projecting portion therein whereby said counterpart portions of said fastening means are spaced from each other at distances greater than the unstretched length of said pane cover such that said pane cover is caused to be tightly and simply stretched to fit against the windshield when in position.

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4,025,104

## SLIDING DOOR FOR VEHICLES, ESPECIALLY AUTOMOBILES

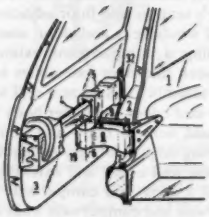
Alfred Grossbach, Tamm, and Ralf Mertin, Sprockhovel, both of Germany, assignors to Lunke & Sohn GmbH, Witten (Ruhr), Germany

Filed Sept. 9, 1975, Ser. No. 611,808

Claims priority, application Germany, Sept. 11, 1974, 2443472

Int. Cl.² B60J 5/06

U.S. Cl. 296—155 6 Claims



1. A sliding door assembly for vehicles comprising:

a longitudinally slidable door;

a guide bar mounted on said door and extending along the length thereof;

a guide head slidably engaging said guide bar for slidably supporting said door;

a supporting arm assembly having said guide head pivotally mounted thereon about a first vertical axis and extending for pivotal mounting engagement with a vehicle body about a second vertical axis parallel with said first vertical axis, and supporting arm assembly in cooperation with said guide head and guide bar operating to guide displacement of said door between a closed position and an intermediate position by pivotal motion of said door about said first axis, and between said intermediate position and an open position by sliding motion of said door guide bar relative to said guide head;

tilting lever means having a first and a second end and pivotally mounted upon said guide head at a point intermediate said ends;

gripper means fixed relative to said door for releaseably gripping said first end of said tilting lever means to prevent relative sliding motion between said guide head and said guide bar;

spring means engaging said tilting lever means and pivotally biasing said first end of said tilting lever means out of engagement with said gripping means; and

cam means arranged on said guide head for engagement with said second end of said tilting lever means to block pivotal motion of said first end of said tilting lever means out of engagement of said gripper means during pviotal motion of said door between said closed position and said intermediate position, and to prevent pivotal motion of said door about said first vertial axis during sliding movement of said door between said intermediate position and said open position;

said cam means operating to stop blocking pivotal motion of said first end out of engagement with said gripper means after said door has reached said intermediate position thereby enabling said spring means to being said first end out of engagement with said gripper means.

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4,025,105

## SPORTS (BACK) SEAT

Charles T. Pekala, 411 Lowry Road, Erie, Pa. 16511

Filed Sept. 10, 1973, Ser. No. 395,390

Int. Cl.² A47C 1/00

U.S. Cl. 297—4 1 Claim

1. A seat comprising a generally rectangular cushion and a resilient strap,

said seat being made of relatively thin rectangular shaped block of foam material,

a cover over said block of material made of sheet-like material,

the ends of said sheet-like material extending beyond the ends of said block of foam material and engaging each other in face to face relationship and sealed together providing an opening,

a tab means at each end of said sheet-like material,

said tab means being folded back on itself in U-shape and receiving the ends of said sheet-like material therebetween,

a D-shaped ring received in each said tab means,

said strap having a snap attached to each end thereof and each snap engaging a respective D-shaped ring,

one end of said strap having a buckle whereby the lengths of said strap can be adjusted,

said strap being adapted to be disposed around the midsection of a person whereby the cushion is held to the small of said person's back adapted to be stretched whereby said cushion can be brought down below said person's hips to serve as a seat and to remain below said person when said person is in the sitting position.

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**4,025,106**
**COLLAPSIBLE CHAIR**

**Eric Kyte, Ilkley, England, assignor to Bulldog Toy Company Limited, Leeds, England**

**Filed Dec. 11, 1975, Ser. No. 639,736**
**Int. Cl.² A47C 4/00**
**U.S. Cl. 297—16** **6 Claims**

1. A collapsible chair comprising hingedly interconnected flat sheet members comprising a seat member, a combined back rest and leg support member, and a second leg support member, said combined back rest and leg support member and second leg support member being hinged to opposite edges of the seat member, and said combined member having a back rest portion and spaced leg support portions which lie on opposite sides of the axis of the hinging between the seat member and the combined member, said leg portions being adapted to engage in cross interlocking fashion with the second leg support member supporting the seat member in substantially horizontal disposition with the back rest portion extending upwardly from the seat member, said chair being capable of being hung on a wall by the combined member so that the combined member, seat member and second support member lie in a common flat plane and can constitute a flat, decorative wall article with the said leg portions of the composite member extending down the sides of the seat member.

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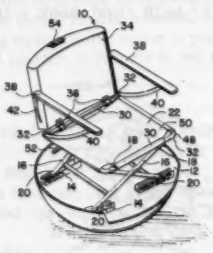
**4,025,107**
**COLLAPSIBLE SPOON-BOTTOM CHAIR**

**Charles Chippa, 16 Park Ave., Spring Valley, N.Y. 10977**

**Filed Jan. 19, 1976, Ser. No. 650,367**
**Int. Cl.² A47C 3/029**
**U.S. Cl. 297—17** **6 Claims**




1. A spoon-bottom chair comprising:
a bowl-shaped bottom;
a first pair of rails attached thereto;
a pair of scissor-type levers, each of said levers having first and second ends, said first ends being slidable in a respective one of said guide rails, said guide rails being formed with a multiplicity of recesses, each of said first ends being formed with two projections placeable within two of said recesses, respectively;
an extensible seat hingeably attached to said second ends, said seat being movable from a seating position outside of said bowl to a collapsed position within said bowl, said seat comprising a first tube and a first pair of bars slidable in opposite directions within said tube, each of said first pair of bars including a transverse rod integral therewith, each of said second ends of said levers being hingeably attached to a respective one of said first pair of bars;
a second pair of scissor-type levers substantially identical with the first pair of scissor-type levers, each lever of said second pair of levers having third and fourth opposite ends;
two crossbars rigidly connecting both scissor-type levers; and
a second pair of guide rails attached to said bottom and disposed in parallel with the first pair of guide rails, said third ends being slidable in said second pair of guide rails, said fourth ends being hingeably attached to a respective one of said transverse rods, whereby the height of said extensible seat above said bowl is adjustable.

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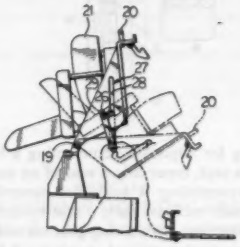
**4,025,108**
**SEAT SUPPORT PROP**

**Conard E. Leighty, Metamora, and Kennith E. Vaughn, Creve Coeur, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed June 10, 1976, Ser. No. 694,629**
**Int. Cl.² B60N 1/02**
**U.S. Cl. 297—335** **10 Claims**




1. In a retractable seat assembly mounted to a fixed support, said assembly having a seat having a mounting element, pivot means for pivotally mounting the mounting element to said support for swinging the seat thereon between a lower seating position and an upper retracted position, improved means for latching the mounting element and seat releasably in the retracted position comprising: a latch pin; means mounting the latch pin to the support including a link arm having opposite ends, said latch pin being mounted to one end, and pivot means for pivotally mounting the other end of said arm to said support; means movable with the seat defining a U-shaped slot slidably receiving said latch pin, the legs of said slot defining a lower guide portion and an elongated upper latch portion, and a transfer portion extending between said latch and guide portions, said latch portion extending generally perpendicular to said transfer portion, said pin being disposed in said guide portion when said seat is in the seating position and being brought to said transfer portion as an incident of said seat being moved to said retracted position from said seating position, said pin being moved through said transfer portion and into said latch portion as an incident of further movement of the seat rearwardly beyond said retracted position to a maximum swung position and return of the seat to the retracted position, said pin being movable from said latch portion as an incident of return of the seat to the maximum swung position

and urging of the pin through the slot transfer portion to said guide portion with the seat being retained adjacent said maximum swung position whereupon lowering of the seat to the seating position may effect movement of the pin through the slot guide portion.

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**4,025,109**

## FITTING FOR ADJUSTABLY CONNECTING A BACKREST MEMBER TO A SEAT MEMBER

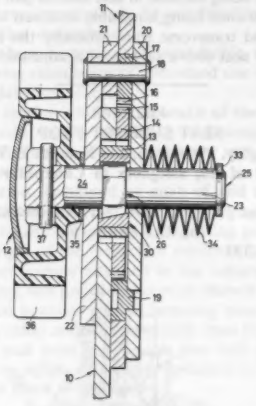
**Gerd Klingelhöfer, and Paul Werner, both of Remscheid, Germany, assignors to Firma Fritz Keiper, Remscheid-Hasten, Germany**

**Continuation of Ser. No. 471,256, May 20, 1974, abandoned. This application Jan. 19, 1976, Ser. No. 650,233**

**Claims priority, application Germany, May 23, 1973, 2326223**

**Int. Cl.² A47C *1/027*; B60N *1/06***

**U.S. Cl. 297—355** **17 Claims**



**1.** A fitting for adjustably connecting a backrest part to a seat part of a seat, especially a seat of an automotive vehicle, said fitting comprising: a back-rest mounting member connectable to said backrest part; a seat mounting member connectable to said seat part; a ring gear on one of said members and having a predetermined number of inwardly directed teeth centered on a ring-gear axis; a spur gear on the other of said members inside said ring gear and having a number less than said predetermined number by at least one of outwardly directed teeth centered on a spur-gear axis radially offset from said ring-gear axis; turning means for displacing said spur-gear for orbiting said spur-gear axis about said ring-gear axis with said outwardly directed teeth meshing with said inwardly directed teeth and said spur gear rolling in said ring-gear, whereby the relative angular position of said members is varied by such displacement; and eccentric means for increasing and decreasing the radial offset between said axes while always maintaining at least one of said outwardly directed teeth in mesh with at least some of said inwardly directed teeth.

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**4,025,110**

## SUSPENSION SEAT SAFETY BELT MOUNTING

**R. William Poorman, Fort Wayne, Ind., assignor to International Harvester Company, Chicago, Ill.**

**Filed Nov. 12, 1973, Ser. No. 415,091**

**Int. Cl.² A62B *35/00*; B60R *21/10***

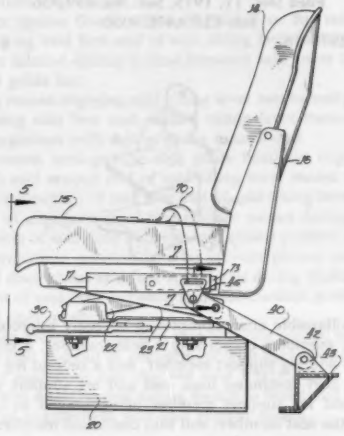
**U.S. Cl. 297—385** **4 Claims**

**1.** A seat belt anchor mechanism for pivotally anchoring one end of a seat belt to each side of a suspension seat having an upper seat support frame movable vertically and horizontally relative to a lower seat frame and to the floor of a vehicle to which the lower seat frame is adapted to be fastened, characterized in that said anchor mechanism comprises:

slide means including a guide member and a slide member slidable on said guide member;

one of said members being fixed to said upper seat support frame and the other of said members being pivotally connected by a rearwardly and downwardly directed rigid pivot link to the vehicle frame at a pivot point behind the seat;

and seat belt anchor support means integral with said other of said members and movable therewith;



said anchor support means being movable vertically in response to up and down movements of said upper seat support frame but remaining stationary relative to the lower seat support frame in response to horizontal fore and aft adjustment movements of said seat support frame; and

the pivot links on each side of said seat being positioned so as to receive all of the loading imparted to the seat belt by an occupant and transmit it to the vehicle frame.

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**4,025,111**

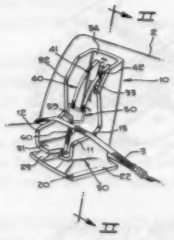
## CHILD SAFETY SEAT WITH IMPROVED ABDOMINAL PAD ADJUSTMENT AND BUCKLE SECURING MEANS

**Akira Tanaka, Northridge, and Gregory G. Kuszynski, Pasadena, both of Calif., assignors to American Safety Equipment Corporation, Encino, Calif.**

**Filed Aug. 28, 1975, Ser. No. 608,656**

**Int. Cl.² A62B *35/00*; B60R *21/10***

**U.S. Cl. 297—390** **18 Claims**



**1.** In a child safety seat including a seating surface, a harness having shoulder strap means anchored to the child safety seat, an abdominal pad attached to said shoulder strap means,

crotch strap means attached to said pad, and means to secure said crotch strap to said seat, the improvement comprising:

said crotch strap having a fixed length, adjustment means on said pad for adjusting the length of said crotch strap which projects from said pad,

said means to secure said crotch strap to said seat includes a buckle plate on said crotch strap, a buckle below said seating surface and securing means provided in said seat for securing said buckle to said seat below said seating surface,

slot means through said seating surface for passage of said buckle plate therethrough, said slot means being aligned with said buckle secured below said seating surface whereby insertion of said buckle plate through said slot connects said buckle and buckle plate together.

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**4,025,112**

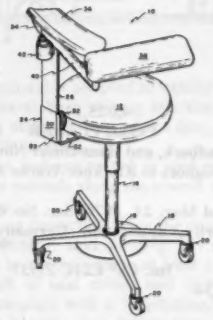
## MEDICAL STOOLS

**Dean H. Hale, 2500 N. Main St., Logan, Utah 84321**

**Filed Dec. 15, 1975, Ser. No. 640,823**

**Int. Cl.² A47C 7/54**

**U.S. Cl. 297—411** **8 Claims**



1. A stool comprising:

a seat;

framework means connected to and supporting the seat;

horizontally disposed means for supporting a load comprising an arm of the user, equipment or the like;

variable resistance pivotal connector means interposed between the framework means and the supporting means, the connector means comprising telescopically interrelated male and female means, at least one of said telescopically interrelated male and female means being relatively tapered in respect to the other, so that the amount of telescopic overlap may be selectively varied manually with minimum effort and no tools, which in turn will vary the resistance to relative rotation of the male and female means to accommodate ready rotation of the supporting means from position to position or retention in a selected position in respect to the framework means.

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**4,025,113**

## LINKAGE MECHANISM FOR HANDLE OPERATED RECLINER CHAIR

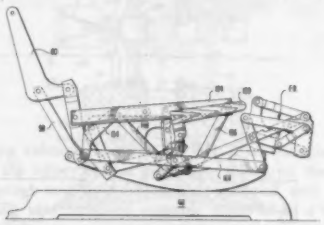
**Walter Clark Rogers, Jr., Denton, N.C., assignor to Royal Development Company, Inc., High Point, N.C.**

**Filed Apr. 9, 1976, Ser. No. 675,565**

**Int. Cl.² A47C 7/50**

**U.S. Cl. 297—434** **12 Claims**

[illegible] liner chair, including a footrest movable between a retracted position adjacent the front of the chair, and an extended position projected forwardly from the front of the chair, the footrest including two footrest linkages mounted on opposite sides of the chair for extending and retracting the footrest relative to the chair and a torque transmitting member extending across the chair interconnecting said footrest linkages such that actuation of one footrest linkage will be transmitted to the other footrest linkage; the improvement comprising hand-operated linkage means connected to said one footrest linkage for actuating the same between extended and retracted positions, including a handle link mounted for pivotal movement about a first horizontal axis, a manual operating handle connected to said handle link



for pivoting the same about said first axis, a second link connected to said torque transmitting member and being mounted for pivotal movement about a second horizontal axis located below said first horizontal axis, and linkage means interconnecting said handle link and said second link for transmitting motion from said handle link to said second link, and wherein one of said handle link and second link is connected to said one footrest linkage for actuating the same when the handle is moved to pivot said handle link about said first axis.

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**4,025,114**

## VEHICLE SEAT CUSHION MOUNTING ARRANGEMENT

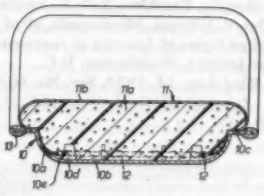
**David N. Cave, Hardingstone, England, assignor to UOP Inc., Des Plaines, Ill.**

**Filed Jan. 26, 1976, Ser. No. 652,350**

**Claims priority, application United Kingdom, Jan. 25, 1975, 3406/75**

**Int. Cl.² A47C 7/02**

**U.S. Cl. 297—452** **5 Claims**

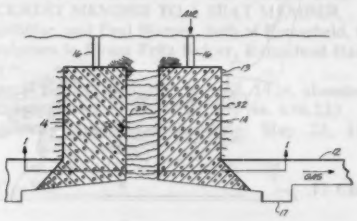


1. A vehicle seat comprising a base, a cushion of foam material, first securing means comprising a wire frame abutting or molded into the foam material, second securing means comprising upstanding hook portions integral with said base and positioned in locking engagement with the first securing means to secure the cushion to the base, and a cover extending over the cushion and attached to the first securing means, the first and second securing means being held together by one or more biassing forces acting transversely of said base.

## 4,025,115
## METHOD OF ENHANCING RECOVERY OF OIL FROM PILLARS ADJACENT IN SITU OIL SHALE RETORT

Gordon B. French, Rifle, and Richard D. Ridley, Grand Junction, both of Colo., assignors to Occidental Petroleum Corporation, Los Angeles, Calif.

Filed Apr. 14, 1975, Ser. No. 567,481
Int. Cl.² E21C 41/10
U.S. Cl. 299—2 24 Claims



1. A method for recovery of shale oil from a fragmented permeable mass of particles in an in situ oil shale retort in a subterranean formation containing oil shale and from fractured unfragmented formation containing oil shale adjacent the fragmented permeable mass, said retort having pillars of a first portion of unfragmented formation defining boundaries for the fragmented permeable mass of particles, said fragmented permeable mass being obtained by fragmenting at least part of a second portion of the formation within such boundaries, comprising the steps of:

excavating a part of the second portion of the formation to form at least one void and leaving a remaining unfragmented part of said second portion extending away from such an excavated void;

explosively expanding said remaining part of said second portion toward such as excavated void for forming the fragmented permeable mass of particles;

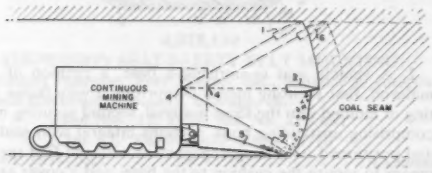
explosively fracturing unfragmented formation containing oil shale in the first portion adjacent the second portion; and

retorting the fragmented permeable mass of particles containing oil shale and fractured formation containing oil shale adjacent to the fragmented permeable mass for recovering carbonaceous products including shale oil therefrom.

## 4,025,116
## METHOD OF OPERATING A CONSTANT DEPTH LINEAR CUTTING HEAD ON A RETROFITTED CONTINUOUS MINING MACHINE

Wallace W. Roepke, Excelsior; Kelly C. Strebig, West St. Paul, and Bradley V. Johnson, Minneapolis, all of Minn., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Aug. 14, 1975, Ser. No. 604,566
Int. Cl.² E21C 25/00, 25/60, 25/68
U.S. Cl. 299—17 11 Claims




1. A method of operating a continuous mining machine having a nonrotary type cutting head with a longitudinal axis to reduce the generation of dust particles at the mine face comprising the steps of:

positioning said machine in an operative position near to the mine face surface to be worked;

sumping into said mine face surface beginning on one of the peripheral sides thereof at a mine face depth of at least three inches with said nonrotary cutting head;

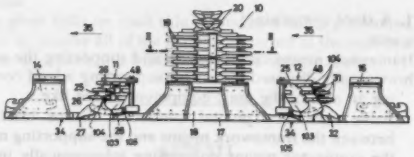
after sumping along said longitudinal axis, shearing substantially perpendicular to said longitudinal axis said mine face at a substantially constant depth equal to the same depth as sumped, said shearing being across most of the mine's face entire width and height without retracting said cutting head from its sumped depth;

conveying said dislodged material away from said mining machine and mine face; and repeating the positioning, sumping, and shearing steps in that order.

## 4,025,117
## COAL PLANER

Karl Bahre, Gladbeck, and Hans-Dieter Nowak, Herne, both of Germany, assignors to Klockner-Werke AG, Duisburg, Germany

Filed Mar. 24, 1976, Ser. No. 670,173
Claims priority, application Germany, Apr. 4, 1975, 2514726
Int. Cl.² E21C 27/35
U.S. Cl. 299—34 13 Claims



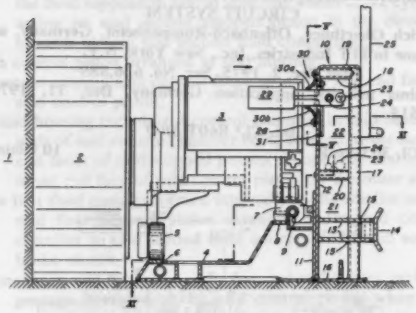
1. A coal planer for mining coal in an underground mine gallery having a sole, a mine face and a ceiling, said coal planer being reciprocable on the sole of the mine gallery in a direction parallel to the mine face and comprising a central unit; two loading heads arranged spaced from and respectively at opposite sides of said central unit; and two intermediate units respectively located between said central unit and said loading heads and linked to the latter and to said central unit, each of said intermediate units comprising a base plate, upright support means connected to said base plate, a plurality of planing knives arranged on said support means, each movable relative said support means along a path extending inclined to said direction and parallel to the sole of the mine gallery between a working position and an inactive position for cutting, in said working position, coal from the mine face, and a bottom knife mounted on said support means for movement relative said support means along a path which is inclined to said direction and is also inclined to the sole of the mine gallery, so that said bottom knife moves between a working position in which said bottom knife engages the mine face and also engages the sole of the mine gallery and an inactive position in which said bottom knife is disengaged from both the mine face and the sole of the mine gallery.

4,025,118

## SPILL-PLATE APPARATUS FOR A MINING MACHINE

Willy Lanfermann, and Otto Renzing, both of Bochum, Germany, assignors to Gebr. Eickhoff, Maschinenfabrik und Eisengiesserei m.b.H., Bochum, Germany

Filed Nov. 28, 1975, Ser. No. 636,306
Claims priority, application Germany, Nov. 29, 1974, 2456442
Int. Cl.² E21C *27/34*
U.S. Cl. 299—43 14 Claims



1. A spill-plate apparatus adapted to extend along one side of the course of travel by a mining machine having cutter means for releasing material from a mine face, said apparatus including the combination of:

a cable having an end connected to said mining machine while the cable extends along the course of travel by the mining machine,

a spill-plate housing projecting along the course of travel by the mining machine, said housing having an internal space adapted to accommodate at least a portion of the extended length of said cable, said spill-plate housing including a face-plate with a longitudinal slot along the length of said housing and facing toward said mining machine,

a carrier extending between the internal space in said housing and said mining machine for supporting the length of said cable extending through the slot in said faceplate, and

shutter means normally closing said slot in the faceplate for preventing the passage of material released from the mine face into the internal space of said spill-plate housing, said shutter means being adapted to accommodate said carrier to move along said slot while extending into said spill-plate housing from said mining machine.

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4,025,119

## METHOD AND APPARATUS FOR STRIP MINING

James P. Watts, 6930 E. Pinchot Ave., Scottsdale, Ariz. 85251

Filed Dec. 1, 1975, Ser. No. 636,407
Int. Cl.² E21C *41/00*
U.S. Cl. 299—18 13 Claims

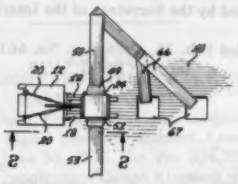
1. In strip mining of a layer of valuable material covered by a layer of overburden, a method comprising the steps of:

a. successively forming a plurality of shafts of substantially square horizontal cross section with each shaft merging in with adjacent shafts whereby a designated area is completely mined,

b. each of said shafts being formed by a vertically movable auger assembly including an auger casing, an auger rotatable in and held against longitudinal movement relative to the auger casing, and a square cutter at the lower end of said auger casing,

c. removing spoil from the overburden through a first discharge port at the upper end of said auger casing as the auger cuts through said overburden,

d. conveying said spoil to a previously formed shaft and depositing the spoil therein,



e. removing valuable material through a second discharge port at the upper end of said auger casing as the auger cuts through said layer of valuable material, and

f. conveying said removed valuable material to a storage receptacle.

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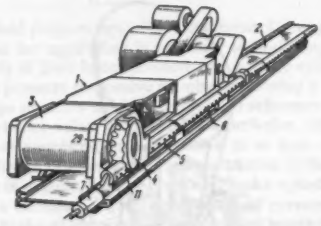
4,025,120

## FEED SYSTEM OF A COAL GETTING COMBINE

Igor Mikhailovich Balinov, Krasnoarmeiskaya ulitsa, 5, kv. 73; Georgy Nikiforovich Samsonov, Krasnoarmeiskaya ulitsa, 5, kv. 37; Vladimir Mikhailovich Balykov, Fakultetsky pereulok, 3, kv. 54; Vadim Ivanovich Paramonov, ulitsa Petra Romonova, 12, kv. 15, and Nikolai Mikhailovich Demyashkin, Leningradsky prospekt, 9, kv. 59, all of Moscow, U.S.S.R.

Filed June 7, 1976, Ser. No. 693,555
Int. Cl.² E21C *29/02*
U.S. Cl. 299—43 11 Claims



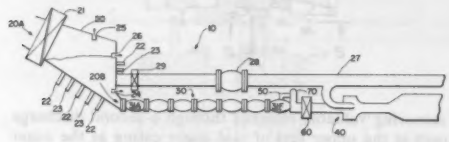
1. A feed system of a coal getting combine, mounted on a face conveyer, comprising: a traction device located on said combine; a cylinder-shaped sprocket, a side surface of said sprocket having a circular spherical-shaped recess, provision being made on both inner sides of said spherical recess for slots having an involute-spherical surface, said sprocket being located on said traction device; a guide bar arranged lengthwise of said conveyer and traversably therealong and fixed at the ends of said conveyer, said guide bar being composed of a number of separate tubular sections articulated together, said sections being provided with open-end holes arranged at right angles to the axes of said sections; and engagement elements adapted to connect said sections to said traction device and shaped as fingers with hemispherical ends, said elements being fitted in said holes of said tubular sections to allow motion pivotally around their own axis and traversably, within certain limits, lengthwise of the axes of said holes in such a way that their ends project from said holes on both sides of said sections; said circular spherical-shaped recess of said sprocket having the tubular shape of said sections, while said sprocket itself is adapted to straddle said sections so that the ends of said fingers engage said slots in said sprocket, thus effecting the involute-spherical mangle-type gearing, whereby turning of the fingers occurs.

4,025,121

## HIGH-PRESSURE INJECTION HYDRAULIC TRANSPORT SYSTEM WITH A PERISTALTIC PUMP CONVEYOR

William K. Kleysteuber, Wexford, and Ernest H. Bean, Pittsburgh, both of Pa., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Feb. 26, 1976, Ser. No. 661,580
Int. Cl.² B65G *53/30*
U.S. Cl. 302—14 4 Claims



1. A high-pressure injection, hydraulic transport system for conveying fluidized solids comprising a pressure hopper for receiving the solids, means for pressurizing said hopper with a liquid pressurizing medium, said liquid pressurizing medium producing a slurry when mixed with the solids, a peristaltic pump conveyor for transporting said slurry, and means for diluting said slurry pumped by said peristaltic pump conveyor to a predetermined volume of concentration of the solids and for further transporting said diluted slurry.

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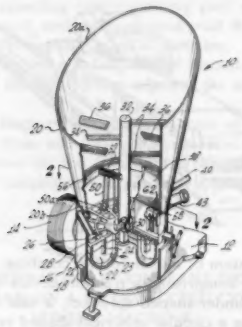
4,025,122

## TRANSMISSION OF GRANULAR MATERIAL

Paul M. Diemert, Upland, Calif., assignor to Reed Manufacturing Co., Inc., Walnut, Calif.

Filed Oct. 3, 1975, Ser. No. 619,366
Int. Cl.² B65G *53/46*
U.S. Cl. 302—49 17 Claims



15. A transmission device for granular material comprising:
a hopper including open upper and lower ends;
a feed assembly including a rotatable feed wheel having a plurality of annularly arranged pockets with a ring of inner ports and a ring of outer ports defining pairs of radially spaced ports corresponding with each of said pockets for communication therewith;
a pneumatic discharge area including an air inlet and a discharge line for sequentially registering with said inner ports and outer ports respectively for discharge of material contained in said pockets;
means for vibrating granular material adjacent said ports including at least one pair of elongated resilient members adjacent the upper face of said feed wheel, each resilient member being an elongated spring wire loop, the longitudinal axes of which is parallel to the axis of rotation of said feed wheel and being radially spaced therefrom, at least one said resilient member being aligned with said ring of outer ports, and said other resilient member being aligned with said ring of inner ports, said resilient members being adapted to be alternately flexed and released responsive to the rotation of said feed wheel thereby to cause said resilient members to vibrate;
mounting means for supporting said resilient members including a mounting bar disposed above said feed wheel to which the ends of said resilient members are secured; and
drive means for rotating said feed wheel.

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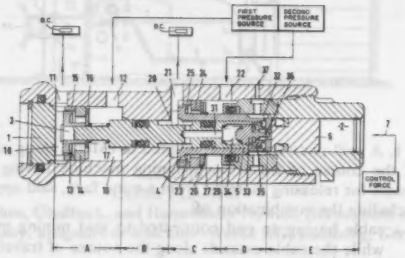
4,025,123

## BRAKE FORCE REGULATOR FOR DUAL BRAKE CIRCUIT SYSTEM

Heinrich Oberthuer, Offenbach-Rumpenheim, Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed Dec. 2, 1975, Ser. No. 636,889
Claims priority, application Germany, Dec. 11, 1974, 2458515
Int. Cl.² B60T *8/00*
U.S. Cl. 303—6 R 10 Claims



1. A brake force regulator for a dual circuit brake system having first and second brake circuits including first and second brake pressure sources connected to at least one first and second wheel brake cylinders associated with each of said first and second circuits through said brake force regulator;
means for providing a control force operatively connected to said brake force regulator;
said brake force regulator including: a housing having an axially extending bore formed therein and having inlet ports operatively connected to each of said brake pressure sources and outlet ports operatively connected to each of said wheel brake cylinders associated with each of said circuits;
a first axially displaceable stepped piston positioned in a portion of the bore of said housing having a larger end face portion and a smaller end face portion, said first stepped piston being positioned for sealed sliding movement in the bore of said housing, including a means forming a first fluid connection in said first brake circuit between said first brake pressure source and said at least one wheel brake cylinder associated with said first brake circuit, means for applying pressure to one side of said larger end face portion of said first stepped piston supplied by said first brake pressure source and for applying said control force to said smaller end face portion, both said first brake pressure and said control force acting on said first stepped piston in the direcion toward opening said first fluid connection, and means for exposing the other side of said larger end face portion of said first stepped piston to the pressure in the fluid supplied to said at least one wheel brake cylinder acting on said first stepped piston in the direction towards closing said first fluid connection;
a second axially displaceable stepped piston positioned in a portion of the bore of said housing having a larger end face portion and a smaller end face portion, said second stepped piston being positioned for sealed sliding movement in the bore of said housing, including a means forming a second fluid connection in said second brake circuit

between said second brake pressure source and said at least one wheel brake cylinder associated with said second brake circuit, means for applying pressure to one side of said larger end face portion of said second stepped piston supplied by said second brake pressure source and for applying said control force to said smaller end face portion, both said second brake pressure and said control force acting on said second stepped piston in the direction toward opening said second fluid connection, and means for exposing the other side of said larger end face portion of said second stepped piston to the pressure in the fluid supplied to said at least one wheel brake cylinder acting on said second stepped piston in the direction towards closing said second fluid connection;

a control piston arranged in said housing;

means causing said control force to act on one end face of said control piston;

said housing including a control chamber in said bore, the ends of said control chamber being formed by the smaller end faces of said stepped pistons on one side and by the other end face of said control piston on the other side;

a first fluid passage formed internally in the smaller end of said first stepped piston extending from said control chamber to said second fluid connection of said second brake circuit,

means in said first passage for opening and closing said first passage operated on by said control piston when said control piston abuts the smaller end of said first stepped piston; and

each of said stepped piston's smaller end faces having an effective surface area acted on by the pressure of the fluid in said control chamber which is a smaller effective surface area than the effective surface area of said control piston's said other face.

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**4,025,124**

## REGULATABLE PUMP DEVICE

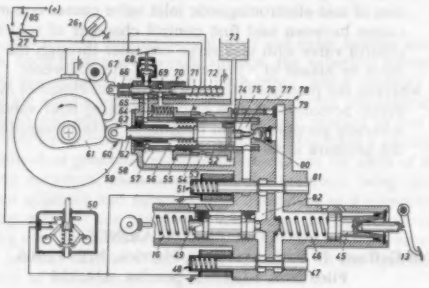
**Werner Karl Heinz Fuchs, Sedlmayrstrasse 14, 8 Munich 19, Germany**

**Filed July 1, 1974, Ser. No. 484,603**

**Claims priority, application Germany, July 6, 1973, 2334493**

**Int. Cl.² B60T** *8/087, 13/16*

**U.S. Cl. 303—10** **13 Claims**



**13.** A regulatable pump device comprising: a cylinder, a reciprocating pump piston therein dividing said cylinder into a first chamber on one end of the cylinder and a second chamber on the other end of the cylinder, so that both chambers are separated from one another and sealed, a piston rod attached to said pump piston, a reservoir chamber, a check valve between the reservoir chamber and said second chamber in order to allow fluid to pass into the second chamber, at least one opening between said second chamber and the reservoir chamber, a valve means for said opening combined with the pump piston, said piston having an oblique edge and is rotatably mounted in said cylinder, so that the oblique edge is selectively in communication with said opening in the second chamber, an adjustable means connected with the pump piston for turning said piston, so that said opening is closeable by the adjustable means and the piston; and further comprising a drive means for actuating the piston of said pump device.

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**4,025,125**

## FLUID PRESSURE OPERABLE BRAKE CONTROL VALVE APPARATUS

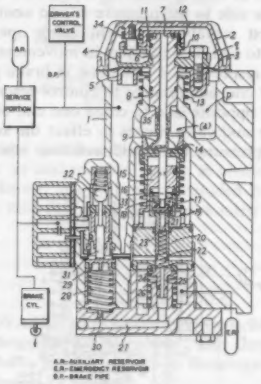
**David John Wickham, London, England, assignor to Westinghouse Brake & Signal Company Limited, London, England**

**Filed June 30, 1975, Ser. No. 591,320**

**Claims priority, application United Kingdom, July 11, 1974, 30850/74; Nov. 14, 1974, 49279/74**

**Int. Cl.² B60T** *15/22*

**U.S. Cl. 303—33** **6 Claims**



**1.** A fluid pressure operable brake control emergency valve apparatus for controlling in response to brake pipe pressure the supply of fluid under pressure into a brake cylinder, comprising a pressure responsive member separating a chamber at brake pipe pressure from a chamber at a reference pressure, a brake cylinder valve, a brake pipe vent valve, said pressure responsive member being responsive to at least a predetermined change of brake pipe pressure relative to the reference pressure in a given time to open said brake cylinder valve to provide a communication between a fluid pressure reservoir and the brake cylinder, a normally closed restricted passage between said reference pressure chamber and atmosphere, the apparatus having means operable upon an initial movement of the pressure responsive member, in a direction to open the brake cylinder valve, to open said restricted passage between the chamber at reference pressure and atmosphere to permit the reference chamber pressure to follow the rate of drop of brake pipe pressure towards the said predetermined rate, the apparatus also having means operable upon further such movement to at least partially reclose the said restricted passage and thereby enhance the further movement to unseat said brake pipe vent valve and open said brake cylinder valve.

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**4,025,126**

## BRAKE CONTROL VALVE DEVICE WITH MOVABLE CONTROL RESERVOIR CHARGING VALVE

**Richard L. Wilson, Monroeville, Pa., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.**

**Filed Jan. 19, 1976, Ser. No. 650,297**

**Int. Cl.² B60T** *11/34*

**U.S. Cl. 303—33** **10 Claims**

**1.** A fluid pressure controlled vehicle brake apparatus comprising, in combination:

a. a normally charged brake pipe, variations of the pressure

of the fluid in said brake pipe being effective to control brake applications and brake releases on the vehicle,

b. an auxiliary reservoir normally charged to the pressure carried in said brake pipe,

c. a control reservoir normally charged to the pressure carried in said brake pipe,

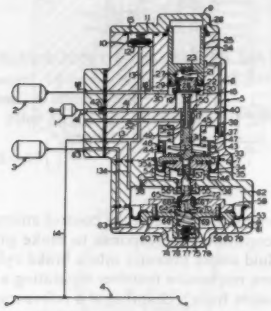
d. fluid pressure operated braking means for effecting a brake application on the vehicle, and

e. a fluid pressure operated brake control service valve device comprising:

i. valve means operable to effect the supply of fluid under pressure from said auxiliary reservoir to said fluid pressure operated braking means and the release of fluid under pressure from said fluid pressure operated braking means to atmosphere,

ii. a stem coaxially arranged with respect to said valve means for effecting the operation thereof,

iii. a first movable abutment subject on one side to the pressure of fluid in said brake pipe and subject on the opposite side to the pressure in said control reservoir, said first movable abutment being operatively connected to said stem to effect its movement in one direction in response to a reduction in brake pipe pressure on said one side relative to control reservoir pressure on said opposite side to cause one end of said stem to operate said valve means to effect the supply of fluid under pressure from said auxiliary reservoir to said



braking means to cause a brake application on the vehicle, wherein the improvement comprises:

iv. control reservoir charging valve means carried on and so operable by said first movable abutment in response to said reduction in brake pipe pressure as to cut off charging of said control reservoir and in response to an increase in the pressure of the fluid in said brake pipe to the pressure of the fluid in said control reservoir to enable charging of said control reservoir, and

v. a second movable abutment subject on one side to the fluid under pressure supplied by said valve means to said braking means and subject on the opposite side to atmospheric pressure, said second movable abutment being so connected to said valve stem as to effect movement of said stem in a direction opposite said one direction in response to the force of fluid under pressure acting on said second abutment in said opposite direction slightly exceeding the fluid pressure force acting in said one direction on said first movable abutment to cause operation of said valve means to cut off flow of fluid under pressure from said auxiliary reservoir to said braking means without causing operation of said charging valve means to effect charging of said control reservoir, said first movable abutment being responsive to a subsequent increase in brake pipe pressure on said one side thereof to effect further movement of said stem in said opposite direction to cause said valve means to establish a venting communication whereby the fluid under pressure supplied to said braking means is released to atmosphere, and operation of said control reservoir charging valve means to enable charging of said control reservoir.

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**4,025,127**

## WHEEL LOCK-UP PREVENTION APPARATUS

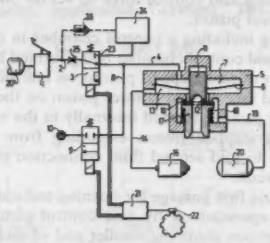
**Helmut Rembold, Moglingen, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed Nov. 5, 1975, Ser. No. 628,905**

**Claims priority, application Germany, Jan. 8, 1975, 2500483**

**Int. Cl.² B60T** *8/02*

**U.S. Cl. 303—118** **3 Claims**



1. a wheel lock-up prevention apparatus for use with the braking system of a motor vehicle, comprising, in combination,

A. a source of pressurized air;

B. a master brake control valve, supplied with air from said source:

C. a relay control valve having a first and second control chamber;

D. an electromagnetic inlet valve disposed between said master brake control valve and said first chamber;

E. an electromagnetic outlet valve, connected to and capable of pressure-relieving said first control chamber;

F. an electric controller for actuating said electromagnetic inlet and outlet valves, respectively; and

G. a surge chamber connected to a line extending to said electromagnetic inlet valve in such a manner that actuation of said electromagnetic inlet valve causes communication between said first control chamber of said relay control valve with said surge chamber through the inlet valve by means of a line extending therebetween;

whereby the pressure increases in said first chamber during cyclic actuation of said electromagnetic inlet valve are inversely proportional in magnitude to the magnitude of the pressure in said first chamber.

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**4,025,128**

## ANTIFRICTION BEARINGS

**Ted Geffner, 48 Park Ave. East, Merrick, N.Y. 11566**

**Filed Nov. 12, 1975, Ser. No. 631,035**

**Int. Cl.² F16C** *29/06*

**U.S. Cl. 308—6 C** **14 Claims**

1. In a rectilinear and rotary motion bearing having relatively spaced first and second race members,

one of said members having relatively spaced bearing lands,

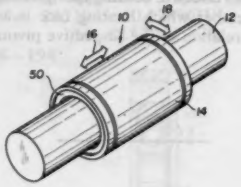
rollable bearing elements in said bearing for movement between said first and second race members and movable into and out of engagement with said bearing lands,

retainer means between and movable relative to said first and second race members and having a plurality of closed loop paths for retaining said bearing elements between said first and second race members, the invention comprising

said closed loop paths each having a pathway defined

therein through which the bearing elements project for rectilinear and rotary rolling engagement with said first and second race members,

said bearing lands being relatively spaced by recesses defined in said one member,



and said lands and closed loop paths being unequal in number with said closed loop path extending continuously for substantially the full effective length of said bearing lands, each said closed loop path having two of said pathways each of which is relatively spaced from the other an extent greater than the extent of each of said bearing lands and less than each of said recesses.

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**4,025,129**

## FRICTION BEARING WITH SLIDING MEMBERS

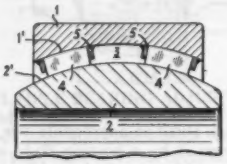
**Günter Markfelder, and Wolfgang Teich, both of Schweinfurt, Germany, assignors to Kugelfischer Georg Schafer & Co., Germany**

**Filed Jan. 15, 1976, Ser. No. 649,241**

**Claims priority, application Germany, Jan. 17, 1975, 2501702**

**Int. Cl.² F16C *33/12***

**U.S. Cl. 308—3 R** **6 Claims**



1. In a friction bearing having inner and outer bearing members, each having a spherical surface, the spherical surfaces being spaced-apart and facing each other, and a plurality of separate sliding members arranged in between the spherical surfaces and adapted for sliding movement relative to one of the bearing members, the improvement comprising a plurality of individual generally annular members, one for each of the sliding members, each of said annular members being positioned adjacent and substantially encompassing a respective sliding member for restraining movement of the respective sliding member relative to the other bearing member, wherein said annular members are fixedly attached to the spherical surface of the other bearing member.

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**4,025,130**

## FLEXIBLE DAMPED BEARING ASSEMBLY

**Keith L. Streifert, Duanesburg, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.**

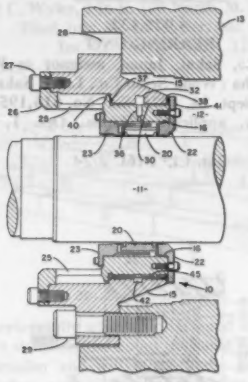
**Filed Oct. 3, 1975, Ser. No. 619,323**

**Int. Cl.² F16C *35/08***

**U.S. Cl. 308—9** **5 Claims**

1. In a flexible damped bearing, for rotatably supporting a shaft, of the type wherein the bearing is mounted within a movable member that is suspended from a stationary frame upon a series of flexure springs and having a cavity containing a fluid film located between the movable member and the stationary frame for damping the bearing reaction, the improvement comprising

seals for maintaining the fluid film within the cavity, said seals being located outside of the damping cavity and being positioned in respect to the movable member to



prevent the seals from being compressed by the movable member as said member moves in compliance with the shaft whereby the seals are precluded from interacting with the fluid film to contribute unwanted damping to the system.

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**4,025,131**

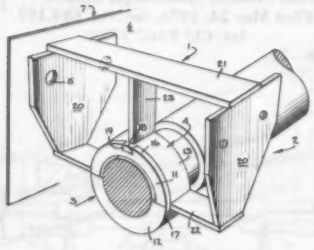
## REMOVABLE SANITARY HANGER BEARING

**Dwight H. Bergquist, Omaha, Nebr., and Gary D. Lorimor, Council Bluffs, Iowa, assignors to Henningsen Foods, Inc., White Plains, N.Y.**

**Filed Jan. 8, 1976, Ser. No. 647,415**

**Int. Cl.² F16C *33/04***

**U.S. Cl. 308—27** **5 Claims**



1. An improved hanger bearing for supporting a drive shaft having a bearing portion of reduced diameter comprising the combination of:

a bearing housing;

support members coupled to said housing and adapted for releasably mounting the housing on a supporting structure for movement axially of the shaft;

a bearing element for said shaft removably positioned within said housing;

said bearing element comprising upper and lower removable sections;

said lower bearing element section having a semi-circular cylindrical inner shaft engaging surface terminating in shaft wiping corner portions;

said upper removable section having a semicircular cylindrical shaft facing surface spaced radially outwardly from the shaft surface;

radially extending flanges on said bearing sections engaging radially extending end surfaces on said bearing housing; and

key means coupling said bearing element to said bearing housing preventing relative rotation.

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**4,025,132**

**BEARING UNIT**

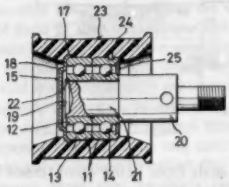
**Katsuro Watanabe, Sakai, Japan, assignor to Wada Seiko Kabushiki Kaisha (Wada Seiko Co., Ltd.), Sakai, Japan**

**Filed Sept. 24, 1975, Ser. No. 616,195**

**Claims priority, application Japan, Oct. 1, 1974, 49-119097[U]**

**Int. Cl.² F16C 1/24**

**U.S. Cl. 308—36.1** **5 Claims**




1. A bearing unit comprising a bearing having an inner race and an outer race, and an opposed pair of cover members secured to said outer race at each end thereof to enclose the gap between the inner and outer races of said bearing, and an annular molded member of synthetic resin molded on the outer race with the interposition of said pair of cover members, integral with said cover members and the outer race thereby retaining grease therebetween and protecting said bearing against dust.

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**4,025,133**

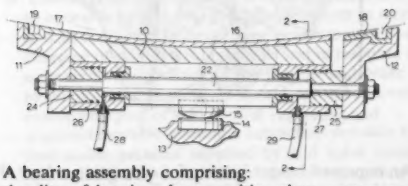
**REVERSIBLE PIVOTED BEARING**

**Arthur Selwyn Cornford, Clarkson, Canada, assignor to Aerofall Mills Limited, Mississauga, Canada**

**Filed May 24, 1976, Ser. No. 689,197**

**Int. Cl.² F16C 17/06**

**U.S. Cl. 308—73** **9 Claims**




1. A bearing assembly comprising:

a plurality of bearing shoes positioned to engage a slide member in supporting relation thereto;

support means including a plurality of pivotal mountings for the bearing shoes,

each bearing shoe providing a bearing face conforming to the shape of the slide member for engagement therewith, and being mounted symmetrically with respect to a respective one of said pivotal mountings;

oil supply means for applying oil to the bearing faces of the shoes whereby to create a hydrodynamic oil film between said bearing faces and the slide member,

each shoe comprising a main shoe portion and a pair of auxiliary shoe portions articulated thereto, each auxiliary shoe portion supporting a respective end portion of the bearing face and being displaceable from an operative position in which the respective end portion is positioned to engage the slide member to an inoperative position in which the respective end portion is disengaged from the slide member; and

means for displacing the auxiliary shoe portions selectively and alternatively from their operative positions whereby to establish an effective bearing face positioned to engage the slide member which bearing face is asymmetrically disposed in relation to the respective pivotal mounting.

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**4,025,134**

**HIGH SPEED LUBRICATED BEARING**

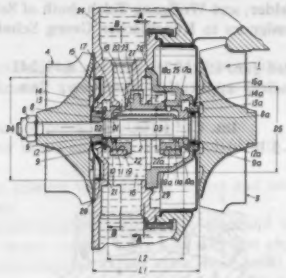
**Josef Reisacher, Ostring 18, D6719 Kirchheim, Germany**

**Filed Jan. 23, 1975, Ser. No. 543,303**

**Claims priority, application Germany, Jan. 26, 1974, 2403768**

**Int. Cl.² F16C 1/24, 13/04, 33/66, 42/02**

**U.S. Cl. 308—122** **6 Claims**

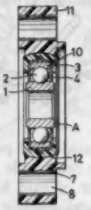


1. A bearing for high-speed rotors, the rotors being mounted for rotation about an appropriate axis, comprising a bearing housing formed by a housing body and a bearing flange attached to said housing body and having cylindrical external damping surfaces in concentric relation to the rotor axis, a chamber containing lubricating oil arranged within said bearing housing, a one-piece bearing bush floating in lubricating oil arranged in said chamber bearing housing with an axial clearance therebetween, further cylindrical external damping surfaces in concentric relation to the rotor axis arranged on the circumference of said bearing bush and in engagement with said damping surfaces of the bearing housing, two bearing supports arranged on said bearing bush in an axially spaced relation to each other, each said bearing support including an axial bearing surface defined by an outer front surface of said bearing bush in normal relation to the rotor axis, and a radial bearing surface directly adjoining said axial bearing surface and formed by a bore in said bearing bush in concentric relation to the rotor axis, annular lubricating oil grooves each provided in said bearing bush in the area of said two radial bearing surfaces, each of said lubricating oil grooves dividing an associated said radial bearing surface into an axially inward narrower radial bearing portion and an axially outward larger radial bearing portion, lubricating oil ducts arranged in said bearing bush and interconnecting said two lubricating oil grooves and also connecting the same with said chamber in said bearing housing containing lubricating oil, and means for securing said bearing bush against any rotation in relation to said bearing housing, said means comprising a radial abutment on said bearing bush and counterabutment on said bearing housing which cooperates with said radial abutment on said bearing housing.

## 4,025,135
## BEARING ASSEMBLY

Tadashi Hishida, Sakai, Japan, assignor to Wada Seiko Kabushiki Kaisha (Wada Seiko Co., Ltd.), Sakai, Japan

Filed Aug. 12, 1975, Ser. No. 603,942
Claims priority, application Japan, Aug. 14, 1974, 49-97622[U]; Feb. 26, 1975, 50-27996[U]
Int. Cl.² F16C 9/06
U.S. Cl. 308—194 1 Claim




1. In a ball bearing assembly having an outer race (3), an inner race (1), and a plurality of balls (2), in combination therewith:

a. an annular cover (4) secured to the outer periphery of the outer race (3), said cover (4) having a recess of U-shape section formed to enclose the outer race (3) and the balls;

b. an annular flange (5) formed on the outer periphery thereof with notches;

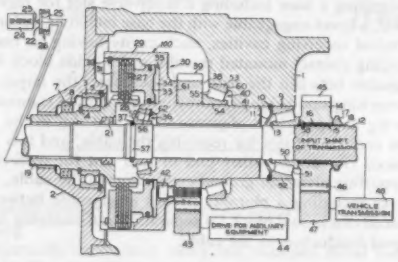
c. a molded spherical member (10) of synthetic resin molded on said cover (4) to be integral therewith and said outer race, said spherical member having a spherical surface on the outer periphery thereof; and,

d. a molded receiving member of synthetic resin having an inner periphery (12) mounted on said spherical member (10), said spherical member (10) being rollable in said receiving member.

## 4,025,136
## MULTIPLE BEARING ADJUSTING DEVICE

Gerardus M. Ballendux, Waukesha, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Nov. 3, 1975, Ser. No. 628,524
Int. Cl.² F16C 13/00
U.S. Cl. 308—207 A 10 Claims

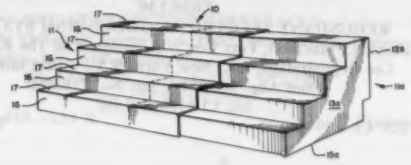



1. A multiple bearing adjustment for a vehicle transmission comprising, a transmission housing, a shaft, a shaft bearing mounted in said housing rotatably supporting said shaft for rotation about an axis, a bearing stop in said housing limiting the axial movement of said bearing in a first direction, means locking said bearing in fixed relation on said shaft, a rotor, a rotor bearing mounted in said housing rotatably supporting said rotor for rotation about a common axis with said shaft, a shaft and rotor bearing mounted between said shaft and said rotor permitting relative rotation between said shaft and said rotor, an adjustable stop mounted on said shaft firmly seating said shaft and rotor bearing axially to provide a simultaneous adjustment for all of the bearings in said transmission.

## 4,025,137
## TERRACED TELESCOPIC STORAGE SHELVES

Margaret C. Wyler, 146 E. 100 North, St. George, Utah 84770

Filed July 25, 1975, Ser. No. 599,320
Int. Cl.² A47B 45/00, 57/00
U.S. Cl. 312—114 2 Claims

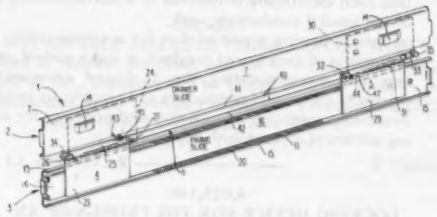


1. A horizontally adjustable terraced storage shelf consisting of two sidepieces of about the same width one of which is slightly smaller and will substantially completely telescope into the other, each sidepiece containing a backwall, an outside endwall and a terraced front consisting of alternating vertical risers and horizontal shelves beginning with a vertical riser at the front lower edge of the outside endwall and terminating with a horizontal shelf which is contiguous with the back top portion of said outside endwall and the top of said back wall, wherein the lower portion of each endwall and corresponding sidewall portion extends inwardly at right angles and then downwardly to define a notch in the bottom portion thereof.

## 4,025,138
## PROGRESSIVE SLIDE ASSEMBLIES

Keith B. Kittle, Berwyn, Pa., assignor to Halle Industries Inc., New York, N.Y.

Filed Feb. 20, 1975, Ser. No. 551,363
Int. Cl.² A47B 88/00
U.S. Cl. 312—334 9 Claims




1. In a progessive slide:

an elongated drawer slide having a pair of races and ball bearings therebetween;

an elongated frame having a pair of races and ball bearings therebetween, the frame slide extending parallel to and substantially coextensive with the drawer slide;

gusset means connecting one of the races of the drawer slide and one of the races of the frame slide;

sheave means interconnected to the gusset means;

coupler means mounted on the other race of said drawer slide;

coupler means mounted on the other race of said frame slide; and

flexible cable means mounted on said sheave means, the cable being made of material providing for the cable to be stretchable in a direction along its axis; and each said coupler means having mechanism to receive the cable

means in stretched condition as between the sheaves and the coupler means and to hold the cable in such condition, the stretched condition providing for the cable to be taut and the cable establishing a driving connection whereby when the other race of said frame slide is held fixed and the other race of said drawer slide is moved, said gusset means, said one rail of the drawer slide and said one rail of the frame slide move in unison in the same direction but at a lower velocity.

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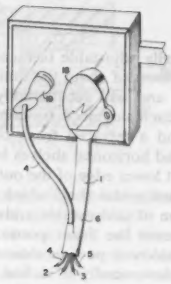
**4,025,139**

## REDUNDANT ELECTRICAL GROUNDING SYSTEM

**Frank C. Martucci, Fort Lee, N.J., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed Aug. 30, 1976, Ser. No. 718,865**
**Int. Cl.² H01R 3/06**
**U.S. Cl. 339—14 R** **7 Claims**



1. A redundant electrical grounding system, comprising

electrically conductive means including two current conductors and two ground conductors each covered with electrical insulation and all housed in an overall sheath of electrical insulation;

a plurality of electrically conductive prongs including two prongs of substantially flat configuration each electrically connected to a corresponding one of the current conductors and two prongs of substantially U-shaped cross-section each electrically connected to a corresponding one of the ground conductors; and

a receptacle haveing a pair of slots for accommodating the flat prongs of the current conductors and a pair of openings for accommodating the U-shaped cross-section prongs of the ground conductors and electrically conductive means extending to said slots and openings for making electrical contact with the prongs.

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**4,025,140**

## LOCKING DEVICE FOR THE PRONGS OF AN ELECTRICAL PLUG

**Edwin J. Matys, Mount Prospect, Ill., assignor to Tula Machine Co., Inc., Chicago, Ill.**

**Continuation-in-part of Ser. No. 494,077, Aug. 2, 1974. This application Nov. 28, 1975, Ser. No. 636,133**
**Int. Cl.² H01R 13/54**
**U.S. Cl. 339—37** **10 Claims**

1. A locking device to cover a prong of an electrical plug and prevent inadvertent use comprising:

a housing defining a chamber opening to one side thereof and adapted to receive and cover a prong of an electrical plug;

said housing having a collared recess on a second side adjacent said one side;

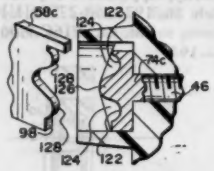
a threaded bore extending from said recess into communication with said chamber;

a locking screw engageable within said threaded bore for pressure contact with said prong within said chamber;

said locking screw having a head portion guidably received within said collar;

said head portion having an outer face and a slotted side; and

a key member having a shank portion with an end matable



with the face of said head portion of said locking screw and a tab portion receivable in said slotted side whereby upon engagement of said key member with said head portion of said locking screw allows said locking screw to be turned into and out of said pressure contact with said prong.

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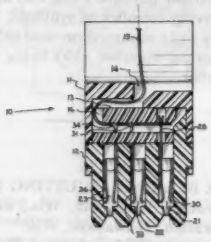
**4,025,141**

## ELECTRICAL CONNECTOR BLOCK

**Guillaume Francois Gustave Thelissen, 's-Hertogenbosch, Netherlands, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Jan. 28, 1976, Ser. No. 653,086**
**Int. Cl.² H01R 9/08**
**U.S. Cl. 339—99 R** **1 Claim**



1. In an electrical connector block for a flat, ribbon cable comprising a base including a transverse slot for receiving a cable, a cover engageable with the base including a plurality of terminal receiving cavities, each cavity having an insulation piercing contact mounted therein, and a guide block interengageable between the base and the cover; the improvement comprising said guide block including a central transverse slot having an opening in alignment with said slot in the base at one end of said slot for receiving the cable, and two rows of spaced ribs at the other end of said slot for recieving and supporting alternate ground conductors in the cable, and the cover including a plurality of fins engageable between said spaced ribs in said block for separating and clamping alternate signal conductors in the cable.

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**4,025,142**

## COVER FOR USE WITH A RIBBON COAXIAL CABLE CONNECTOR

**John Henry Huber, and Suel Grant Shannon, both of Harrisburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Continuation of Ser. No. 641,413, Dec. 17, 1975, abandoned. This application Sept. 1, 1976, Ser. No. 719,547**
**Int. Cl.² H05K 1/12**
**U.S. Cl. 339—128** **3 Claims**

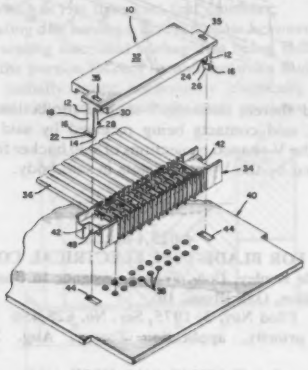
1. A cover for use with an electrical connector of the type having side slots and downwardly facing shoulders in associa-

tion therewith and useful for removably locking the connector to a printed circuit board or the like having a pair of spaced openings therethrough, said cover comprising:

a. a lid adapted to be positioned on the connector;

b. a rearward extension on the lid having a depending bar extending across the width thereof, said bar adapted to provide strain relief for a cable which may be attached to the connector; and

c. a pair of resilient legs each depending from opposite sides



of the lid and each being a single unit and having a lower and an upper latch thereon, said lower latch being positioned on the outside surface of the leg and projecting outwardly, said upper latch being spaced above the first latch on the inside surface of the leg and projecting inwardly, said upper latches adapted to engage the shoulders and removably lock the lid to the connector and the lower latches adapted to be inserted through the openings and removably lock the connector to the printed circuit board or the like.

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**4,025,143**

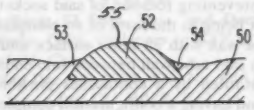
**ELECTRICAL CONTACTS**

**John J. Rozmus, 1030 Derwydd Lane, Berwyn, Pa. 19312**

**Continuation of Ser. No. 585,616, June 10, 1975, Pat. No. 3,990,864. This application June 2, 1976, Ser. No. 692,226**

**Int. Cl.² H01R** *3/00*

**U.S. Cl. 339—278 C** **2 Claims**



1. A spring contact having a precious metal contact surface comprising:

an electrically conductive, elongated, stamped metal body made of resilient material;

an open ended slot extending transverse and thru the body from the edge to edge thereof and being located adjacent one end of the body;

an electrically conductive metal section having a metal base and an integral, precious metal contact surface, the base being disposed in said slot in electrical connection therewith and extending thru said slot with the respective ends of the base being flush with said edges of the body and the surface being located outwardly of the body for establishing an electrical connection with a mating electrical conductor and the base providing mechanical strength for the section and the metal of the base having substantially the same coefficient of expansion as the metal of the body; and

on each of the opposite sides of the slot, the body material extending over and tightly engaging the contact surface, the engagement permenently fixing the section in the slot and providing for exposure of a substantial portion of the contact surface for making said electrical connection with a mating conductor.

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**4,025,144**

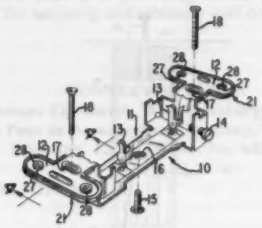
**ISOLATED GROUND RECEPTACLE**

**Ronald N. Thibeault, Buena Park, Calif., assignor to Soln Basic Industries, Inc., Milwaukee, Wis.**

**Filed Mar. 31, 1976, Ser. No. 672,163**

**Int. Cl.² H02G** *3/08*

**U.S. Cl. 339—133 R** **7 Claims**



1. A strap for mounting an electrical wiring device in a mounting box comprising a yoke member having mounting tabs on each end thereof for fastening to a mounting box, there being a slot in each tab for receiving a mounting screw therein, a pad of electrically insulating material on a face of said tab to be positioned on a mounting box, said pad having a portion thereon projecting into said slot and defining a beveled aperture having resilient lips to engage threads of a mounting screw received in the slot to prevent free movement of a mounting screw with respect to said strap, the extremity of said pad portion being flanged over the adjacent face of said tab upon which it is positioned to secure said pad to said tab.

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**4,025,145**

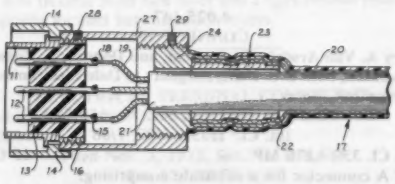
**REPAIRABLE SHIELDED CABLE CONNECTOR**

**Clifford K. Shaffer, Westfield, and Joe B. Weiss, Indianapolis, both of Ind., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed May 17, 1976, Ser. No. 686,769**

**Int. Cl.² H01R** *19/06, 43/04*

**U.S. Cl. 339—143 R** **6 Claims**



1. An electrical connector for use with a multiconductor cable having a metallic shield thereon comprising,

a threaded coupling means having a plurality of contact elements therein adapted to engage with mating contact elements of a mating coupling means,

a cylindrical adapter having a bore therethrough and an outer enlarged threaded portion,

a cylindrical terminator positioned within said bore of said cylindrical adapter and said metallic shield of said cable being positioned between the outer surface of said cylin-

drical terminator and the surface of the bore of said cylindrical adapter, and

a cylindrical extender having first and second internal threaded sections, said first threaded section being engageable with said threaded coupling means and said second threaded section being engagable with said outer enlarged threaded portion of said cylindrical adapter.

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**4,025,146**

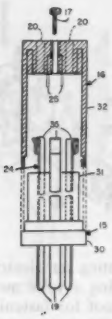
## ELECTRICAL CONNECTION DEVICES

**Michele Famiglietti, Final del Puente 9 de Diciembre El Paraso, and Raul Betancourt Sucre, Centro Villasmil, Piso 3, Oficina 303 Apartado No. 2842, both of Caracas, Venezuela**

**Filed Nov. 10, 1975, Ser. No. 630,244**

**Int. Cl.² H01H** *85/02, 85/36*

**U.S. Cl. 339—147 P** **1 Claim**



1. An electrical connection device, comprising a body portion provided with female terminal elements and matching male terminal elements connected to the corresponding female terminal elements by respective fusible elements located inside said body portion, said body portion being constituted by a circular base, a cylindrical cap which fits coaxially to the base, and a rod-form member secured coaxially to the circular base and extending coaxially within the cylindrical cap to define therewith a space of generally annular cross-section, and wherein the male terminal elements extend through said base and into said space while the female terminal elements extend within said space from the opposite end thereof from said base and are maintained in electrical contact with the male terminal elements by said fusible elements, said fusible elements being located in said space, each fusible elements being connected to at least one other fusible element by an elastic tape which is maintained under tension to urge the fusible elements into contact with the terminal elements.

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**4,025,147**

## CONNECTOR

**Larry A. Van Arsdale, Springfield, and Dominic J. Russo, Sr., Yankton, both of S. Dak., assignors to Dale Electronics, Inc., Columbus, Nebr.**

**Filed Jan. 19, 1976, Ser. No. 650,520**

**Int. Cl.² H05K** *1/07, 1/08*

**U.S. Cl. 339—176 MP** **13 Claims**

1. A connector for a substrate comprising,

an elongated body having opposite ends, and upper and lower ends,

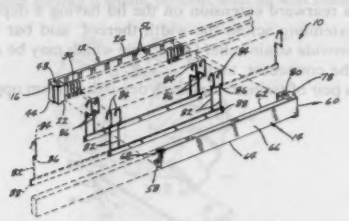
said body having inner and outer walls defining a substrate slot extending downwardly therbetween from the upper end therof,

contact positioning means on said inner wall,

spaced-apart contacts mounted on said inner wall and having an upper end portion extending over said inner wall into said substrate slot, the lower ends of said contacts extending downwardly from said body,

and an elongated backer frame having opposite ends, and upper and lower ends, said backer frame being secured to said body

said body and said backer frame having V-shaped slots



formed therein defining V-shaped projections therebetween, said contacts being received by said V-shaped slots, the V-shaped projections of said backer frame being received by the V-shaped slots in said body.

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**4,025,148**

## SOCKET FOR BLADE-TYPE ELECTRICAL CONTACTS

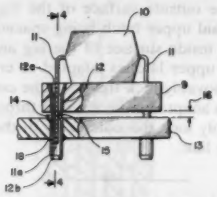
**Jean-Claude Bouley, Dole, France, assignor to Bunker Ramo Corporation, Oak Brook, Ill.**

**Filed Nov. 3, 1975, Ser. No. 628,456**

**Claims priority, application France, Aug. 29, 1975, 75.26663**

**Int. Cl.² H01R** *9/14;* **H05K** *1/10*

**U.S. Cl. 339—176 MP** **11 Claims**



1. A socket for blade-type electrical contact pins, wherein the pins are restrained against rotational movement, said socket comprising:

an insulating support plate having a bore therethrough;

a least one contact socket in said bore, said socket having an entry end for receiving a blade-type contact pin and an opposite end remote from said entry end; and

means for preventing rotation of said socket in said bore;

said contact being in the form of an elongated tube including a tube wall with an inner surface and a constriction formed in said tube wall between said ends, said constriction constituted by a continuous portion of said inner surface and having a configuration complementary to the shape of the contact pin but oriented at an angle relative to the orientation of an inserted pin, thereby effecting a retentive torqueing force between said socket and pin at said constriction.

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**4,025,149**

## LONGITUDINALLY SEALED INSULATING SUPPORT ARRANGEMENT FOR HF-COAXIAL CONNECTORS

**Georg Spinner, Erzgiessereistr. 33, 8 Munich 2, Germany**

**Filed July 22, 1975, Ser. No. 598,045**

**Claims priority, application Germany, July 29, 1974, 2436495**

**Int. Cl.² H01R** *17/08;* **F16J** *15/10*

**U.S. Cl. 339—177 R** **5 Claims**

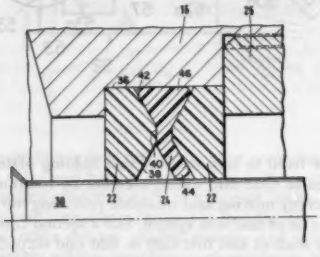
1. A longitudinally sealed insulating support arrangement for HF coaxial connectors, or the like, comprising:

a pair of component discs separated from each other; each

said component disc having a first opening therethrough of a first diameter; each said component disc having a respective facing side facing toward said facing side of the other said component disc; each said facing side having a radially inner section that is tapered inwardly into its said component disc moving radially inwardly on the said component disc;

a sealing disc interposed between and engageable with said facing sides of said component discs; said sealing disc being comprised of elastic material; said sealing disc having a second opening therethrough of a second diameter which is less than said first diameter;

said sealing disc having a first thickness between the sides of said sealing disc; said sealing disc being sufficiently thin that the portion thereof located between said component disc radially inner sections is elastically deflectable toward either of said radially inner sections;



an annular bead of generally circular cross section and of greater thickness than said first thickness extending around the periphery of said sealing disc;

said first and second openings being aligned, whereby an object of said first diameter that is passed through said openings will deform said sealing disc against a said radially inner section of one said component disc;

said component disc facing sides each also having a radially outer section, radially outward of its said radially inner section, and each said radially outer section tapers inwardly into its said component disc moving radially outwardly on the said component disc, whereby a generally wedge shaped pressure surface is defined by both said radially outer sections said wedge shaped pressure surfaces being shaped and positioned to engage said sealing disc bead and bias it radially outwardly.

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**4,025,150**

## EQUIPMENT HOUSING FOR COMMUNICATION SYSTEM

**Svein T. Nordberg, El Paso, Tex., and Donald R. Shaner, Thousand Oaks, Calif., assignors to GTE Sylvania Incorporated, Stamford, Conn.**

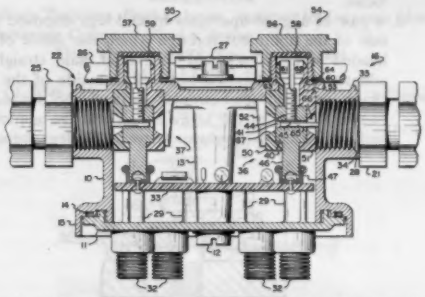
**Filed Dec. 12, 1975, Ser. No. 640,020**
**Int. Cl.² H01R** *7/12*
**U.S. Cl. 339—177 R** **8 Claims**

1. An equipment housing for a communication system wherein signals are coupled via a coaxial cable comprising:

first and second ports adapted for alternative attachment to said coaxial cable and a third port having a shoulder therein;

a connector including a metallic block with first and second intersecting bores therethrough and a third bore intersecting said first and second bores, a threaded insert in said third bore for securing a wire in either of said first and second bores, and a terminal for making connection to electrical circuitry in said equipment housing; and

retaining means for retaining said connector in said equipment housing with said first, second, and third bores aligned with said first, second, and third ports, respectively, said retaining means having a cooperating extension for insertion into said third port and a shoulder for latchably engaging said shoulder in said third port, said first and second bores for alternatively receiving a signal carrying conductor associated with said coaxial cable,



and said third port providing access to said threaded insert for securing and releasing said conductor.

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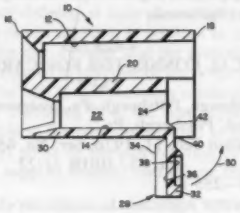
**4,025,151**

## CONNECTOR BLOCK

**George Thomas Eigenbrode, Mechanicsburg, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Jan. 12, 1976, Ser. No. 648,513**
**Int. Cl.² H01R** *13/40*
**U.S. Cl. 339—210 M** **9 Claims**



1. A block for receiving a terminal or like member including a body molded of rigid filled thermo-plastic material and having a terminal cavity with an open end formed therein; and a rigid gate integrally molded as a part of the body and joined to the body adjacent the open end of the cavity by a hinge portion, the hinge portion including a first flexible resin rich layer on a surface of the hinge portion adjacent the open end of the cavity to permit rotation of the gate about the flexible layer to a closed position blocking the open end of the cavity and a tensile break extending through both a second flexible resin rich layer on a surface of the hinge portion spaced from said first flexible resin rich layer and a rigid central resin-filler composite located between such layers.

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**4,025,152**

## ELECTRICAL TERMINAL CONNECTOR

**Arnold N. Jacobson, 1535 Big Horn Ave., Sheridan, Wyo. 82801**

**Filed Nov. 3, 1975, Ser. No. 628,517**
**Int. Cl.² H01R** *9/10*
**U.S. Cl. 339—246** **3 Claims**

1. A terminal clip for use with the straight end of a circular electrical wire, comprising:

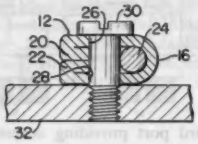
a. an elongated strip of metal of uniform thickness having an integral bend between its ends to form a pair of parallel legs of equal length and spaced apart substantially the diameter of the wire;

b. said bend having an inner semi-circular surface adjacent which said straight end is adapted to lie;

c. a bent extension on the end of at least one of said legs,

forming an abutment therebetween adapted to prevent movement of the legs toward each other at their abutting locus;

d. a pair of aligned apertures in said legs disposed at one side of the abutment through which the shank of a flat headed screw is adapted to extend, said straight end adapted to be disposed between one side of the screw shank and said semi-circular surface, the distance between one side of the screw shank and the semicircular surface, at a point midway between the legs, being substantially one diameter of the wire, the head of the screw being of such size that one side thereof may engage one leg at a locus above the abutment and its opposite side may engage said one leg at a locus above the wire; and




e. the construction and arrangement being such that said legs may be moved slightly toward each other by the screw head at the locus above the wire to clamp same thereto but are prevented from such movement at the locus above the abutment, whereby the legs remain substantially parallel and the screw is not subjected to bending when tightened.

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**4,025,153**

## ELECTRICAL CONNECTOR FOR CARPET SEAMING TAPE

**Ralph Rodenbaugh, Pittsburgh, Pa., assignor to Deco Coatings Corporation, Pittsburgh, Pa.**

**Filed Feb. 11, 1976, Ser. No. 657,251**

**Int. Cl.² H01R *11/22***

**U.S. Cl. 339—255 R** **8 Claims**

1. A connector apparatus to couple an electrical cable of a low-voltage and high-current power supply to an electrically-resistive heater strip carrying a layer of thermoplastic adhesive along one face surface of the strip, said apparatus including the combination of:

an elongated connector housing including a clamp jaw having a support surface for the housing at one end thereof and a projecting leg defining a support surface for the housing at the end thereof opposite to said clamp jaw, the support surfaces of said clamp jaw and said projecting leg being arranged at one side of the housing for support thereof at opposite sides of said heater strip while positioning said housing in an inclined manner to extend downwardly toward the support surface of said clamp jaw while passing in a spaced-apart relation above said layer of thermoplastic adhesive carried by said heater strip,

a bus bar carried by said housing for movement toward and away from said clamp jaw to releasably engage said heater strip,

resilient means supported by said housing for urging said bus bar toward said clamp jaw, and

means to couple said bus bar to said cable.

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**4,025,154**

## OPTICAL SCANNING SYSTEM

**Koichi Yuta, Kokubunji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

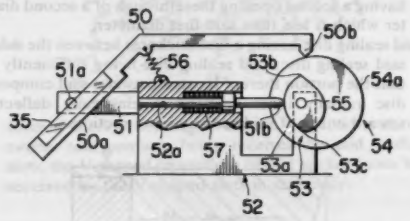
**Filed Sept. 23, 1974, Ser. No. 508,718**

**Claims priority, application Japan, Sept. 23, 1973, 48-107199; Sept. 22, 1973, 48-107200; Sept. 22, 1973, 48-107201**

**Int. Cl.² G02B *27/17***

**U.S. Cl. 350—7** **2 Claims**

1. An optical scanning system comprising a lens system for focusing an image of respective image information elements onto a scanning surface, a rotatable reflecting mirror arranged between said lens system and said scanning surface for the purpose of scanning the image focused by said lens system onto said scanning surface, a holding plate rotatably holding said rotatable reflecting mirror so that said rotatable mirror can be rotated about a shaft of said holding plate, a sliding member fixed to said shaft of said holding plate, a first cam arranged to slide said sliding member by rotation of said first cam thereby moving said rotatable reflecting mirror along the optical axis of said lens system, and a second cam mounted to a rotary shaft of said first cam so that said second cam rotates integrally with said first cam in order to rotate said holding plate and the rotatable reflecting mirror.

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**4,025,155**

## IMAGE-TRANSMITTING OPTICAL SYSTEM

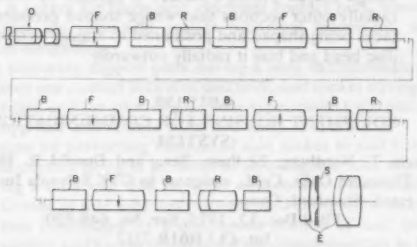
**Toshihiro Imai, Hachiouji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Dec. 8, 1975, Ser. No. 638,661**

**Claims priority, application Japan, Dec. 10, 1974, 49-141191**

**Int. Cl.² G02B *23/00***

**U.S. Cl. 350—45** **2 Claims**



1. An image-transmitting optical system comprising field lenses and relay lenses arranged alternately and glass blocks with parallel planar surfaces, each of said relay lenses being a positive cemented doublet lens consisting of a concave lens and convex lens cemented to each other, each of said glass blocks with parallel planar surfaces being arranged between each field lens and relay lens, equivalent optical length $d/n$ of each of said glass blocks with parallel planar surfaces satisfying the following condition:

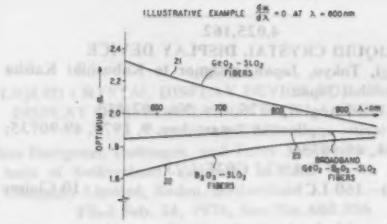
$$f_R < d/n < 2f_R$$

wherein reference symbol $d$ represents thickness of each glass block with parallel planar surfaces, reference symbol $n$ represents refractive index of each glass block with parallel planar surfaces, and reference symbol $f_R$ represents focal length of each relay lens.

## 4,025,156
## GRADED-INDEX FIBER FOR MULTIMODE OPTICAL COMMUNICATION

Detlef Christoph Gloge, Red Bank; Ivan Paul Kaminow, New Shrewsbury, and Herman Melvin Presby, Highland Park, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 12, 1975, Ser. No. 612,625
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 WG 5 Claims

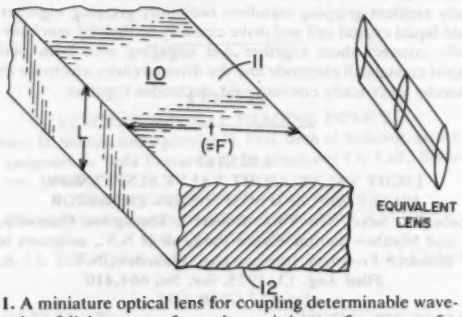



1. A waveguiding optical fiber of the type comprising principally fused silica and having a core of radially-graded index associated with a graded density of a dopant, and a cladding surrounding said core, characterized in that the core includes at least one other dopant graded radially and said dopant gradings together achieve simultaneously minimum intermode dispersion at a first wavelength and another improved dispersion-related property of said fiber.

## 4,025,157
## GRADIENT INDEX MINIATURE COUPLING LENS

William E. Martin, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 26, 1975, Ser. No. 590,539
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 C 5 Claims




1. A miniature optical lens for coupling determinable wavelengths of light energy from the emitting surface area of a source having a known index of refraction comprising:

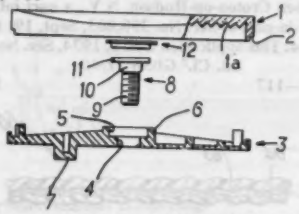
a composite semiconductor material transparent to said determinable wavelengths of light energy and having an index of refraction substantially matching that of said source;

said material having a configuration of pairs of parallel rectangular flat surfaces of maximum dimensions less than one hundred microns, each said pair being disposed orthogonally relative to each other pair, and the composition of said material varying between at least one pair of said parallel rectangular flat surfaces for causing a predetermined gradient index of refraction, producing a desired focal length for said determinable wavelengths of light energy orthogonal to said gradient index of refraction.

## 4,025,158
## REFLECTOR

Sadaharu Tsuyama, Osaka, Japan, assignor to Tsuyama Manufacturing Company, Osaka, Japan

Filed Oct. 22, 1975, Ser. No. 624,600
Int. Cl.² G02B 5/12
U.S. Cl. 350—99 4 Claims

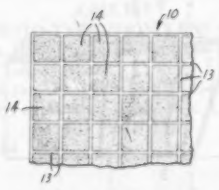



1. A reflector for bicycles and like vehicles comprising a reflector body having a reflective surface, a rear support housing made from plastic material thermally sealed to said reflector body along a rear marginal rim thereof and having a major bore and a minor bore coaxially formed therein in predetermined axial relationship relative to the rear support housing; a bolt axially extended through said two coaxially formed bores, said bolt having a head, a neck portion and a screw portion, said head of said bolt being seated in said major bore, the neck portion of said bolt being accommodated in said minor bore, and the screw portion of said bolt extending from said housing and a cap having a flange thermally sealed to an annular wall defining at least part of said major bore so as to immovably retain said bolt in position in said bores, one of the bores being non-circular and the complementary portion of the bolt retained in said one of the bores being non-circular, whereby the bolt is non-rotatably retained in the bores, and a projection extending from the rear support housing in spaced relationship to the bolt and adapted to cooperate with a support bracket so as to prevent rotation of the reflector relative to such support bracket and orient the reflector as desired.

## 4,025,159
## CELLULAR RETROREFLECTIVE SHEETING

Joseph M. McGrath, Maplewood, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 17, 1976, Ser. No. 658,284
Int. Cl.² G02B 5/128
U.S. Cl. 350—105 15 Claims




1. Retroreflective sheeting comprising (1) a base sheet having a layer of retroreflective elements disposed over one of its surfaces; (2) a cover sheet disposed in spaced relation from the layer of retroreflective elements; and (3) a network of narrow intersecting bonds extending between said cover sheet and base sheet and comprising binder material thermoformed at the point of contact between said bonds and at least one of said cover sheet and base sheet so as to adhere the two sheets together and form a plurality of cells within which retroreflective elements are hermetically sealed; characterized in that the binder material is selected from materials that show increased adhesion to said at least one of the cover sheet and base sheet when a solid layer of the material that has been previously laminated to said sheet is cured, and further characterized in that the binder material is cured in situ after being

thermoformed, whereby the bonds have increased bond strength to the cover sheet and base sheet.

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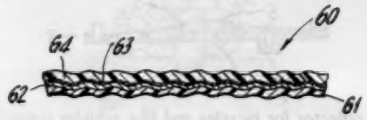
**4,025,160**
**DUAL PURPOSE PROJECTION SCREEN**
**Eugene Martinez, Irvington-on-Hudson, N.Y., assignor to Robert H. Reibel, Croton-on-Hudson, N.Y., a part interst**
**Continuation-in-part of Ser. No. 398,883, Sept. 19, 1973, Pat. No. 3,844,644. This application Oct. 9, 1974, Ser. No. 513,348**
**Int. Cl.² G03B *21/60***
**U.S. Cl. 350—117** **11 Claims**




1. A dual purpose photographic front projection screen comprising a milky white, translucent, flexible, plastic film having a front, surface to face a projection source, a reflective metal layer on the opposite surface of said film, said film allowing projected rays to pass through said film to be reflected back through the film by the surface of said metal layer adjacent said plastic film, and said film also carrying the image caused by rays passing therethrough while the rays are projected onto said front surface of said film, and a layer of flexible opaque reflective material bonded to the surface of the metal layer remote from said film, said opaque layer providing a strengthening backing for said film and metal layer, and presenting an exposed side serving as a reflecting surface for images projected onto said exposed side of said opaque layer.

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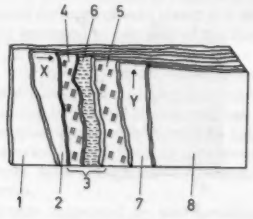
**4,025,161**
**ELECTRO-OPTICAL LIQUID-CRYSTAL DISPLAY DEVICE**
**Ulrich La Roche, Zurich, Switzerland, assignor to BBC Brown Boveri & Company, Limited, Baden, Switzerland**
**Filed Oct. 16, 1974, Ser. No. 515,336**
**Claims priority, application Switzerland, Nov. 12, 1973, 15876/73**
**Int. Cl.² G02F *1/13***
**U.S. Cl. 350—160 LC** **5 Claims**




1. An electro-optical liquid-crystal display device which retains its contrast even when viewed through an intervening plane polarizer, comprising:
two plane polarizers in spaced relationship;
an electro-optical layered structure positioned between said two plane polarizers;
said electro-optical layered structure comprising two parallel transparent plates having electrodes thereon, a layer of nematic liquid crystal positoned between said transparent plates, said nematic liquid crystal being wall-oriented so that the liquid crystal molecule on the surface of the first transparent plate are arranged in one direction and on the surface of the second transparent plate are arranged in another direction perpendicular to the first direction to rotate through 90° the polarization direction of the impinging linearly polarized light as long as no electrical field is applied to said electrodes; and
a quarter wavelength layer adjacent a first one of said plane polarizers on the viewing side of said display device such that said plane polarizer and said quarter wavelength layer together form a circular polarizer, said first plane polarizer being located between said quarter wavelength layer and said electro-optical layered structure

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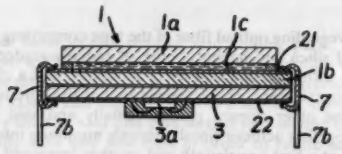
**4,025,162**
**LIQUID CRYSTAL DISPLAY DEVICE**
**Kenjiro Yagi, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan**
**Filed Aug. 6, 1975, Ser. No. 602,445**
**Claims priority, application Japan, Aug. 9, 1974, 49-90735; Aug. 9, 1974, 49-90736**
**Int. Cl.² G02F *1/13***
**U.S. Cl. 350—160 LC** **10 Claims**




1. A liquid crystal display device comprising: a liquid crystal cell comprised of first and second superposed and spaced apart transparent plates, an electrode on the one face of said second transparent plate which faces said first transparent plate, and liquid crystal material sandwiched between said transparent plates; drive circuitry superposed beneath the other face of said second transparent plate for driving said liquid crystal cell, said drive circuitry including an electrode which is electrically insulated from the liquid crystal cell electrode; and a set of electrically conductive and mechanically resilient gripping members resiliently gripping together said liquid crystal cell and drive circuitry to thereby mechanically connect them together and engaging with both said liquid crystal cell electrode and the drive circiutry electrode to thereby electrically connect said electrodes together.

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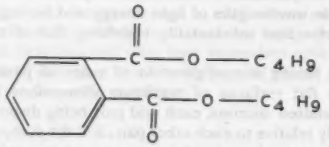
**4,025,163**
**LIGHT VALVE, LIGHT VALVE SUSPENSION MATERIALS AND SUSPENSION THEREFOR**
**Robert L. Saxe, New York; Robert I. Thompson, Plainview, and Matthew Forlini, Ozone Park, all of N.Y., assignors to Research Frontiers, Incorporated, Plainview, N.Y.**
**Filed Aug. 13, 1975, Ser. No. 604,410**
**Int. Cl.² G02B *5/23***
**U.S. Cl. 350—160 R** **16 Claims**




1. A light valve comprising:
a cell
means associated with said cell for applying an electric field thereto,

an electrically responsive liquid suspension in said cell including:

a plurality of suspended particles which are responsive to an electric field to change the transmission of radiation through the suspension, and

a suspending medium including a suspended material which acts to maintain the dispersion of the particles suspended therein, when an electric field is applied, in substantially the same condition of dispersion as in the absence of the electric field.

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## 4,025,164
## LIQUID CRYSTAL DISPLAY DEVICE FOR COLORED DISPLAY OF INFORMATION WITH A SELECTIVE POLARIZER

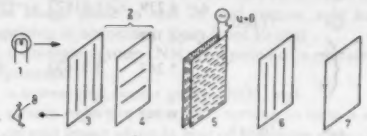
**Rino Doriguzzi, Dottingen, and Terry J. Scheffer, Wettingen, both of Switzerland, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland**

**Filed Feb. 24, 1976, Ser. No. 660,986**

**Claims priority, application Switzerland, Mar. 17, 1975, 3352/75**

**Int. Cl.² G02F 1/13**

**U.S. Cl. 350—160 LC** **14 Claims**




1. A liquid crystal display device for the colored display of information with a reflector and a twisted nematic liquid crystal cell placed between a linear polarizer and a selective polarizer wherein the selective polarizer is disposed in front of the twisted nematic liquid crystal cell and the linear polarizer is disposed between the twisted nematic liquid crystal cell and the reflector.

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## 4,025,165
## ELECTRO OPTICAL IMAGING DEVICE

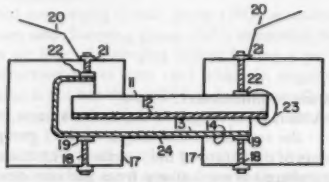
**Bruce D. Sollish, and Ephraim H. Frei, both of Rehovot, Israel, assignors to Yeda Research & Development Co. Ltd., Rehovot, Israel**

**Filed Sept. 30, 1975, Ser. No. 618,053**

**Claims priority, application Israel, Oct. 4, 1974, 45787**

**Int. Cl.² G01S 9/66**

**U.S. Cl. 350—161 S** **12 Claims**




1. In an acoustic-to-optical imaging device having a transducer responsive to an acoustic beam applied to one surface thereof and means for producing a viewable image, the improvement comprising as the transducer therein a foil electret, having an optically transparent conducting backplate as one of its electrodes and a second electrode.

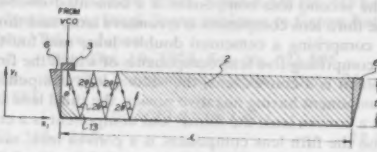
## 4,025,166
## ACOUSTO-OPTIC LIGHT BEAM SCANNER

**E. Barry Felstead, Kanata, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Canada**

**Filed Jan. 12, 1976, Ser. No. 648,584**

**Int. Cl.² G02F 1/33**

**U.S. Cl. 350—161 W** **6 Claims**




1. A light beam scanner comprising:

an acoustic cavity transparent to optical energy having a predetermined length $l$ between two end surfaces, a width $w$ between two side surfaces and a substantially constant thickness $t$ between the two remaining surfaces which are perpendicular to the side surfaces, said cavity being capable of supporting acoustic energy of frequency $f$ reflected through the length of the cavity at an angle of incidence $\theta$ to said remaining surfaces, where

$$\theta = \cos^{-1} \frac{mv}{2t} \frac{1}{f}$$

where $m$ is an integer and $v$ is the velocity of acoustic energy in the cavity;

means for generating ultrasonic waves of controlled frequency $f$ having a continuous distribution of direction in one end of said cavity;

light source means for directing a beam of collimated monochromatic light having a wavelength $\lambda$ onto one of said side surfaces to be transmitted through said cavity and diffracted by said acoustic energy; and

means for focussing the light beam leaving said cavity onto a plane at a point $\theta$, $d$, where

$$d = \frac{\lambda f_l}{v} f$$

where $f_l$ is the focal length of the focussing means.

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## 4,025,167
## TELEPHOTO-TYPE ZOOM LENS SYSTEM

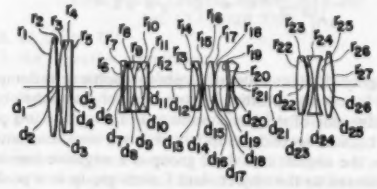
**Yoshitsugi Ikeda, Hachiouji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Jan. 30, 1975, Ser. No. 545,750**

**Claims priority, application Japan, Feb. 4, 1974, 49-14290**

**Int. Cl.² G02B 15/14**

**U.S. Cl. 350—184** **4 Claims**




1. A telephoto-type zoom lens system comprising a varifocal afocal system and a fixed relay lens system; said varifocal afocal lens system comprising a first lens group being utilized for focusing and having function as a convex lens, a second

lens group having function as a concave lens, and a third lens group having function as a convex lens; said fixed relay lens system comprising a fourth lens group; said first lens group comprising two lens components of which the first lens component is a biconvex lens and the second lens component is a cemented doublet lens consisting of a biconvex lens and biconcave lens; said second lens group comprising three lens components of which the first lens component is a concave lens, the second lens component is a cemented doublet lens and the third lens component is a concave lens; said third lens group comprising a cemented doublet lens; said fourth lens group comprising five lens components of which the first lens component is a convex lens, the second lens component is a lens component having negative power, the third lens component is a convex lens, the fourth lens component is a concave lens and the fifth lens component is a convex lens; said telephoto-type zoom lens system further satisfying the following conditions:

$$0.36 < \frac{n_1 - 1}{r_1} f_1 < 0.45 \quad (1)$$

$$0.45 < -\frac{r_3}{r_2} < 0.60 \quad (2)$$

$$0.64 < \frac{n_3 - 1}{r_3} f_1 < 0.66 \quad (3)$$

$$0.15 < \frac{n_5 - 1}{r_5} f_1 < 0.20 \quad (4)$$

wherein reference symbol $f_1$ represents the focal length of said first lens group, reference symbols $r_1$ and $r_2$ respectively represent radii of curvature of front and rear surfaces of the first lens component of said first lens group, reference symbols $r_3$ and $r_5$ respectively represent radii of curvature of the surface on the object side and surface on the image side of the second lens component of said first lens group, and reference symbol $n_1$, $n_2$ and $n_3$ respectively represent refractive indexes of respective lenses of said first lens group.

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**4,025,168**

## WIDE ANGLE PHOTOGRAPHIC LENS

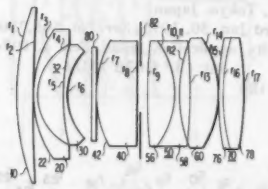
**Takahiro Sugiyama, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 22, 1975, Ser. No. 642,824**

**Claims priority, application Japan, Dec. 20, 1974, 49-146955**

**Int. Cl.² G02B 5/22, 9/64**

**U.S. Cl. 350—196** **4 Claims**



Aperture ratio 1 : 1.4 Angular field 75° F = 100

| Lens | Radius of Curvature r | Lens Thickness or Distance d | Refractive Index n | Abbe No. ν |
|---|---|---|---|---|
| | $r_1$= 282.699 | | | |
| $L_1$ | | $d_1$=18.662 | $n_1$=1.61800 | $\nu_1$=63.4 |
| | $r_2$= 1656.318 | | | |
| | | $d_2$= 0.351 | | |
| | $r_3$= 132.638 | | | |
| $L_2$ | | $d_3$= 4.216 | $n_2$=1.51633 | $\nu_2$=64.1 |
| | $r_4$= 58.362 | | | |
| | | $d_4$=28.285 | | |
| | $r_5$= 223.254 | | | |
| $L_3$ | | $d_5$= 4.239 | $n_3$=1.51823 | $\nu_3$=59.0 |
| | $r_6$= 71.000 | | | |
| | | $d_6$=24.767 | | |
| filter | ∞ | 5.263 | 1.51633 | 64.1 |
| | ∞ | | | |
| | | 0.702 | | |
| | $r_7$= 126.145 | | | |
| $L_4$ | | $d_7$=44.704 | $n_4$=1.80518 | $\nu_4$=25.4 |
| | $r_8$= −5909.840 | | | |
| | | $d_8$=10.526 | | |
| | $r_9$= 449.925 | | | |
| $L_5$ | | $d_9$=30.414 | $n_5$=1.78590 | $\nu_5$=44.1 |
| | $r_{10}$= −96.757 | | | |
| | | $d_{10}$= 0.000 | | |
| | $r_{11}$= −96.757 | | | |
| $L_6$ | | $d_{11}$= 5.649 | $n_6$=1.84666 | $\nu_6$=23.9 |
| | $r_{12}$= 155.465 | | | |
| | | $d_{12}$=16.408 | | |
| | $r_{13}$= −367.339 | | | |
| $L_7$ | | $d_{13}$=30.418 | $n_7$=1.81600 | $\nu_7$=46.8 |
| | $r_{14}$= −103.609 | | | |
| | | $d_{14}$= 0.565 | | |
| | $r_{15}$= 263.621 | | | |
| $L_8$ | | $d_{15}$= 4.211 | $n_8$=1.84666 | $\nu_8$=23.9 |
| | $r_{16}$= 158.143 | | | |
| | | $d_{16}$=18.993 | $n_9$=1.77250 | $\nu_9$=49.7 |
| $L_9$ | $r_{17}$= −394.870 | | | |

Back focal length = 133.512 $F_{1.2.3}$ = −124.223
$F_{1.2.3.4.5}$ = −201.857 Σd = 248.373 D = 91.293
Sum of Petzval = 0.184

1. A highly efficient wide angle photographic lens comprising seven lens groups positioned consecutively from the object to the image side of the lens system, said first group is a positive lens $L_1$, said second group is a negative meniscus lens $L_2$ convex to the object, said third group is a negative meniscus lens $L_3$ convex to the object, said fourth group is a positive lens $L_4$, said fifth group is a negative lens in the form of a compound lens comprising positive and negative lens elements $L_5$ and $L_6$, respectively, said sixth group is a positive lens and said seventh group is a positive lens, and a diaphragm being interposed between said fourth group and said fifth group, wherein said fifth group comprises joined positive and negative lenses, said sixth group is a simple lens $L_7$, said seventh group is a positive lens constructed by joining a positive lens $L_8$ and a negative lens $L_9$, and further comprising a filter positioned between said third and said fourth groups, the elements of said wide angle lens having the following characteristics and dimensions:

all distances are in millimeters, where

$F$ : the resultant focal length of the entire system,

$F\ 1_{.2 \ldots i}$ : the resultant focal length of the $i$ group,

$r_j$ : the radius of curvature of the $j$ surface, with the surfaces being numbered consecutively from the one nearest the object side,

$d_j$ : the thickness of air gap between the $j$ and $j+1$ surfaces

$n_k$ : the refractive index of the $k$ lens,

$\nu_k$ : the Abbe number of the $k$ lens,

$\Sigma d$ : the overall length of the lens system,

$D$ : the length from the first surface of the fourth group to the final surface of the fifth group.

4,025,169

## HIGH SPEED WIDE ANGLE OBJECTIVE LENS SYSTEM

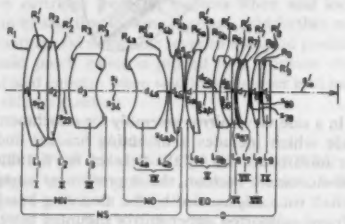
Helmut Fischer, Oberkochen; Erhard Glatzel; Walter Jahn, both of Heidenheim (Brenz), and Heinz Zajadatz, Essingen, all of Germany, assignors to Carl Zeiss-Stiftung, Oberkochen, Germany

Filed Mar. 29, 1976, Ser. No. 671,129

Claims priority, application Germany, Mar. 29, 1975, 2514081

Int. Cl.[2] G02B *13/04*

U.S. Cl. 350—212 25 Claims



1. An extremely high speed wide angle objective lens system for forming an image of a distant object in front of said system on an image plane in rear of said system, said lens system comprising in succession from front to rear

1. a diverging group (NN) composed of a plurality of components,
2. a converging ocular group (NO), and
3. a main objective group (O) serving to form a real image on said image plane in rear of said main objective group, said diverging group (NN) and said converging ocular group (NO) together forming a Newtonian finder telescope (NS) in the nature of a reverse Galilean telescope, said groups being so formed and dimensioned and so related to each other that
4. the focal length of said diverging group (NN) is not less than 0.106 and not more than 0.690 times the focal length of said converging ocular group (NO), and
5. said diverging group (NN) has at least three components,
   i. of which is a negative component having a rear surface which is bounded by air and which is concave toward the rear,
   ii. another of which is a positive component located behind said negative component, and
   iii. another of which is a negative component located behind said positive component and having a rear surface which is concave toward the rear and which constitutes the rearmost surface of said diverging group (NN),
   iv. there being an air lens of diverging action between said first mentioned negative component and said positive component, and an air lens of converging action between said positive component and said other negative component,
6. said converging ocular group (NO) is spaced rearwardly from said diverging group (NN) to provide between them an air lens of diverging action having a paraxial surface refractive power sum ($\phi_L$) which in negative numerical value is not less than 0.948 and not more than 1.808 times the equivalent refractive power ($\Phi$) of the entire lens system,
7. said converging ocular group (NO) has a plurality of components spaced axially from each other to provide an air lens of collecting action followed by a positive component, such air lens acting to provide, for a middle bundle of rays, a strongly divergent ray path bent by said positive component to a ray path differing only slightly from a paraxial course,
8. said main objective group (O) has a plurality of components receiving rays from said converging ocular group (NO) and transmitting them to produce a real image on said image plane, and
9. said main objective group (O) has a paraxial focal length which is not less than 1.53 and not more than 2.73 times the equivalent focal length of the entire lens system.

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4,025,170

## RETRO-FOCUS TYPE WIDE ANGLE OBJECTIVE LENS

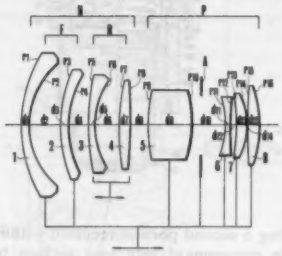
Naoto Kawamura, Inagi, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 10, 1975, Ser. No. 621,595

Claims priority, application Japan, Oct. 21, 1974, 49-121141

Int. Cl.[2] G02B *13/04*

U.S. Cl. 350—214 12 Claims



1. A retro-focus wide-angle objective lens corrected for short distance photography, comprising:

a first lens group N at the object end and having a negative refractive power,

a second lens group P closer to the image end and having a positive refractive power, said first lens group N including a front lens group having a negative refractive power and a rear lens group, said front lens group producing a divergent light bundle,

said rear lens group being located in the divergent light bundle from the front lens group, said rear lens group having a negative lens toward the object and a first positive lens,

said second lens group P including a front positive lens facing said first positive lens of said rear lens group and a diaphragm disposed toward the image end of said front positive lens,

said first and second lens groups N and P being movable toward the object for short distance photography, said front lens group and said second lens group P being movable in unison with each other at a rate different from the rate of said rear lens group.

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4,025,171

## APPARATUS FOR PARFOCALIZING OBJECTIVES

Theodore H. Peck, Irondequoit, N.Y., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.

Filed Feb. 17, 1976, Ser. No. 658,201

Int. Cl.[2] G02B *7/02*

U.S. Cl. 350—255 4 Claims

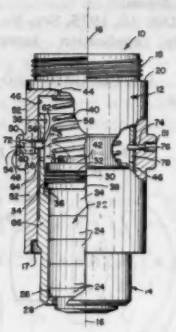
1. An objective comprising:

a. a first generally tubular shaped member having a longitudinal axis, first and second ends and an intermediate side portion, said first member including means adjacent one of said ends for detachably securing said objective to, for instance, the nosepiece of a microscope;

b. a second generally tubular shaped member coaxial with and at least partially and slidably received within said first member, said second member supporting; at least one optical element, said second member also including a slot elongated in the direction of said axis, said slot including a surface;

c. means, supported between said first and second members, for urging said second member out of said first member;

d. means for limiting the outward movement of said second member relative to said first member and for parfocalizing said objective by axially adjusting the outward position of said second member relative to said first member, said adjusting means including a first portion supported on said side portion of said first member and rotatable relative to said first member, said adjusting means further



including a second portion received within said slot and held in engagement with said surface by said urging means when said second member is in said outward position, said second portion being out of engagement with said surface when said second member is moved into said first member independently of said adjusting means; and

e. means, cooperable with said first portion of said adjusting means, for preventing said first portion of said adjusting means from rotaing, said rotation prevention means being supported on said first member.

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**4,025,172**

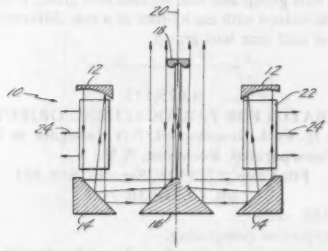
**COMPOUND UNSTABLE RESONATOR**

**Robert J. Freiberg, South Windsor, Conn., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Oct. 9, 1975, Ser. No. 620,995**

**Int. Cl.² G02B** *5/10*

**U.S. Cl. 350—294** **11 Claims**



**1.** In a first unstable resonator having a centerline including both an end mirror with a reflective surface symmetric about the centerline and a folding mirror having a base and an apex with a reflective surface extending from the base to the apex to form a tapered reflector which is symmetric about the centerline and faces the end mirror, the improvement comprising a second unstable resonator formed along the centerline between the reflective surfaces of the end and folding mirrors.

**4,025,173**

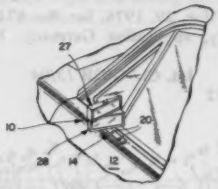
**SIDE VIEW MIRROR ASSEMBLY**

**Wilbur Schmaedeke, 311 Wisconsin, Frankfort, Ill. 60423**

**Filed Mar. 10, 1976, Ser. No. 665,541**

**Int. Cl.² G02B** *5/08*

**U.S. Cl. 350—304** **7 Claims**



**1.** In a side view mirror assembly for attachment to a motor vehicle which includes a mounting bracket and upper and lower mirrors carried by the bracket for simultaneous rotational movement thereon, the improvement comprising:

a shaft rotatably carried by the mounting bracket;

a frame-supported upper mirror mounted rotatably on said shaft;

a frame-supported lower mirror mounted non-rotatably on said shaft;

a plurality of detent notches formed in the frame of one of said upper and lower mirrors;

and a spring-biased detent tooth mounted in the other of said mirror frames cooperable selectively with individual ones of said notches, whereby said upper mirror can be rotated about said shaft from a first position in which said mirrors are locked for simultaneous rotation on said mounting bracket in a first fixed angular relationship relative to each other to a second position in which said mirrors are locked for simultaneous rotation on said mounting bracket in a second fixed angular relationship relative to each other.

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**4,025,174**

**CINECAMERA CAPABLE OF SYNCHRONOUS RECORDING**

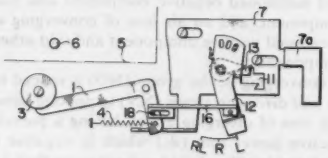
**Katsuhide Takagi, Okaya, and Toshiro Fukasawa, Nagano, both of Japan, assignors to Sankyo Kogaku Kogyo Kabushiki-Kaisha, Suwa, Japan**

**Filed May 5, 1975, Ser. No. 574,669**

**Claims priority, application Japan, May 8, 1974, 49-51893**[U]

**Int. Cl.² G03B** *23/02*

**U.S. Cl. 352—72** **5 Claims**



**1.** A cinecamera for simultaneous recording of sound and image on a film comprising:

a film capstan,

an L-shaped swingable arm supporting a pinch roller at one end thereof and pivotable about a pivot at the junction of its legs,

a shutter release lever operable between a first normal position and a second operative position in which a filming operation can occur,

a pivoted locking lever selectively operable between at least a first locking position and a second release position,

means controlled by said locking lever to permit operation of said shutter release lever only when said locking lever is in its said release position,

and further means comprising a connecting lever operatively connected between said locking lever and one leg of said swingable arm to swing said arm about its pivot, said further means being controlled by said locking lever to actuate said swingable lever to a first position in which said pinch roller is moved away from said capstan by a sufficient distance to facilitate the loading and unloading of a film cartridge from the camera when said locking lever is in its said first locking position, said further means also actuating said swingable lever to a second position in which said pinch roller is moved to a position closely adjacent said capstan when said locking lever is in its said second release position.

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4,025,175

## MACHINE FOR READING IMAGE CARRIERS

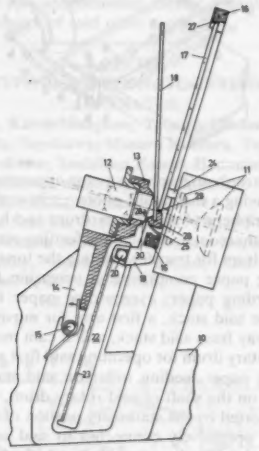
Max Leibundgut, and Tony Reber, both of Zurich, Switzerland, assignors to A L O S AG, Switzerland

Filed Apr. 9, 1976, Ser. No. 675,346

Claims priority, application Switzerland, Apr. 11, 1975, 4618/75

Int. Cl.² 353 *27 R*; G03B *1/48*

U.S. Cl. 353—23 6 Claims



1. Apparatus for reading images from an image carrier, the apparatus including an optical reading system having a condenser and a projecting lens, the apparatus comprising:

means for holding an image carrier, said holding means extending in a substantially upright direction and including two glass plates between which the image carrier can be arranged, a frame overlapping an upper horizonal edge of a first of said glass plates for holding such plate, spring means for causing said first glass plate to be clamped within said frame, hinge means connected to a lower horizontal edge of the second of said glass plates and enabling said second glass plate to be swiveled out of the plane of said frame away from said first glass plate at its upper end, said hinge means being arranged between said spring means and a lower horizontal edge of said first glass plate, said spring means further pressing said second glass plate against said first glass plate, and said frame with said glass plates being slidable up and down across the optical plane of the optical system;

means for pressing said glass plates towards each other in the area of the optical plane of the optical system as said glass plates are slidably moved past the optical plane so that the image carrier is held in a flat position between said glass plates and so that the swivelling of said second glass plate can only occur when said holding means is slid into its uppermost end position with respect to said reading apparatus; and

means serving to automatically cause said second glass plate to swivel away from said first glass plate as said holding means is moved into said end position.

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4,025,176

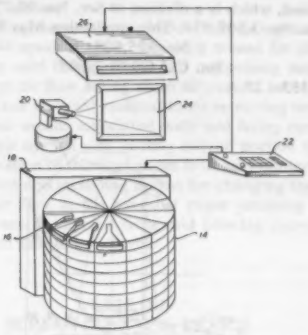
## GRAPHIC COMMUNICATION SYSTEM

Ira L. Lopata, 35 Sutton Place, New York, N.Y. 10022

Filed May 19, 1975, Ser. No. 578,680

Int. Cl.² G03B *21/10*, *25/00*

U.S. Cl. 353—26 A 16 Claims



1. A high-speed storage, retrieval and display system for graphic data comprising:

source documents disposed on strips of microfilm containing along the lengths thereof a plurality of image frames;

a plurality of microfilm cartridges for housing said strips containing said image frames, wherein the contents of each of said image frames comprises a source document and a source document address in graphic form, said source document address defining the location of its corresponding image frame within said system;

a plurality of rotatable supports, each of which is divided into sectors and each sector having disposed therein one of said plurality of cartridges, each support having assigned thereto a first address, each sector having assigned thereto a second address and each of said plurality of image frames having assigned thereto a third address, the combination of said first, second and third addresses forming said source document address which defines the location of a particular one of said plurality of image frames;

addressing means for inserting into said system said source document address, said addressing means comprising:

a communication keyboard through which said first, second and third addresses are entered; and

an integral memory and display associated with said communication keyboard for verifying said first, second and third addresses prior to entry into the system;

a display station;

retrieving means responsive to said source document address for automatically transporting a particular one of said plurality of cartridges to said display station;

means for locating a particular one of said plurality of image frames in the received cartridge, said means for locating responsive to said source document address;

means for displaying at said display station on a display screen the contents of said particular one of said plurality of image frames, said contents representing the desired source document and including its source document address;

a memory for storing digital index data with said first, second and third addresses;

a controller coupled to said memory for controlling the operation thereof and the entry of said digital index data, said memory accessed from said keyboard through said controller; and

a data capture unit coupled to said controller for supplying said memory with said digital data.

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**4,025,177**

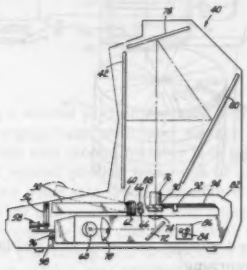
**MICROFICHE VIEWER**

**Ben Howard Owens; Clyde Eugene LeFevre, both of Orange, and James Patrick Hagan, Laguna Beach, all of Calif., assignors to Addressograph Multigraph Corporation, Cleveland, Ohio**

**Continuation-in-part of Ser. No. 464,976, April 29, 1974, abandoned, which is a division of Ser. No. 95,770, Dec. 7, 1970, Pat. No. 3,807,074. This application May 8, 1975, Ser. No. 575,508**

**Int. Cl.² G03B** *23/08*

**U.S. Cl. 353—27 A** **1 Claim**



1. A microfiche viewer comprising a magazine,

a plurality of planar microfiche carriers contained within said magazine in parallel relationship, an optical projection assembly movable along a first axis, kicker means mounted on said assembly for partially ejecting from said magazine a carrier selected from said plurality of carriers,

first roller means having an axis perpendicular to the plane of said carrier and perpendicular to said first axis and engageable with side edges of said carrier,

second roller means having an axis parallel to said first axis and engageable with opposing surfaces of said carrier,

first drive means for rotating said first and second roller means to move said selected carrier along a first coordinate,

second drive means for moving said assembly along said first axis perpendicular to said first coordinate,

first sensing means for providing a first feedback potential determined by the instantaneous position of said carrier along said first coordinate,

second sensing means for providing a second feedback potential determined by the instantaneous position of said assembly along said first axis,

first selector means for providing a first pre-selected potential,

second selector means for providing a second pre-selected potential carrier along said,

third selector means for providing a third pre-selected potential said assembly along said,

means for summing said first pre-selected potential and said second feedback potential and applying the resulting summed potential to said said second drive means upon activation of said first selector means said second drive means thus positioning said assembly such that said kicker means ejects the selected carrier from said magazine

means for summing said second pre-selected potential and said first feedback potential and applying the resulting summed potential to said first drive means upon activation of said selector means, said first drive means thus positioning said selected carrier along said first coordinate, and

means for summing said third pre-selected potential and said second feedback potential and applying the resulting summed potential to said second drive means upon activation of said third selector means, said second drive means thus positioning said assembly along said first axis perpendicular to said first coordinate.

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**4,025,178**

**ELECTROPHOTOGRAPHIC COPYING APPARATUS HAVING A DUAL CAM SYNCHRONIZING MECHANISM**

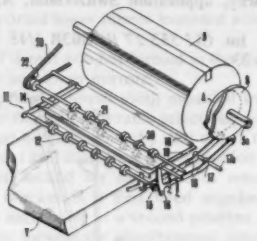
**Michiaki Yokozawa, and Harunori Okabe, both of Tokyo, Japan, assignors to Iwatsu Electric Co., Ltd., Tokyo, Japan**

**Filed Jan. 31, 1975, Ser. No. 545,903**

**Claims priority, application Japan, Mar. 1, 1974, 49-23266; Mar. 1, 1974, 49-23772**

**Int. Cl.² G03G** *15/00*

**U.S. Cl. 355—3 R** **2 Claims**



1. In an electrophotographic copying apparatus including a rotary drum having a shaft and a photosensitive sheet wrapped around the periphery of said rotary drum and having a toner image formed thereon, apparatus for feeding recording paper to said rotary drum for transfer printing the toner image upon said recording paper comprising: a magazine for holding a stack of recording paper, a recording paper feeding roller disposed above said stack, a first arm for moving said roller toward and away from said stack, a first cam mounted on the shaft of said rotary drum for operating said first arm to dispose said recording paper feeding roller on said stack, a second cam mounted on the shaft of said rotary drum, a second arm pivotally supported by the stationary portion of the apparatus with one end operatively connected to said second cam, a segmental gear mounted on the other end of said second arm, a pinion driven by said segmental gear for driving said recording paper feeding roller to feed the uppermost sheet of said stack toward said rotary drum in a predetermined timed relationship with the rotation of said rotary drum, an intermediate roller disposed between said stack and said rotary drum for temporarily arresting said recording paper fed by said recording paper feeding roller, and means for driving said intermediate roller for feeding said temporarily arrested recording paper to said rotary drum in synchronism with the rotation of said rotary drum.

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**4,025,179**

**PASSIVE CROSS MIXING SYSTEM**

**David H. Hudson, Holcomb, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed May 5, 1975, Ser. No. 574,491**

**Int. Cl.² G03G** *15/08;* **B01F** *5/00*

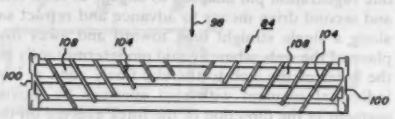
**U.S. Cl. 355—3 DD** **8 Claims**

5. An electrophotographic printing machine of the type having a photoconductive member, means for charging the photoconductive member, and means for exposing the charged photoconductive member to a light image of an origi-

nal document recording an electrostatic latent image thereon, wherein the improvement includes:

a housing defining a chamber storing a supply of developer mix comprising carrier granules and toner particles therein;

means, located in the chamber of said housing, for moving the developer mix from the chamber in said housing to the latent image so that the latent image attracts thereto a portion of the toner particles in image configuration; and




a plate member, disposed in the chamber of said housing, to receive the unused developer mix and denuded carrier granules, said plate member comprising a plurality of progressively shorter chutes in an inward direction disposed symmetrically about the central region thereof to direct the flow of developer mix and denuded carrier granules inwardly from the marginal regions to the central region with the developer mix and denuded carrier granule velocity being greater at the central region than at the marginal regions thereof, thereby preventing the developer mix and denuded carrier granules from clogging the chutes of said plate member.

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**4,025,180**

## TRANSFER TYPE ELECTROPHOTOGRAPHIC COPYING APPARATUS

**Takaji Kurita, Kawachinagano; Tetsuya Utsumi, Toyokawa; Hiroshi Ikeda, Toyokawa; Masaru Komura, Toyokawa; Shin Miyata, Toyokawa; Yoshihisa Kawai, Hommachi, and Kenichi Arai, Toyokawa, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

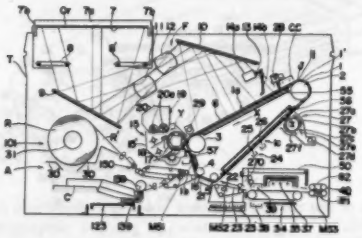
**Continuation of Ser. No. 518,942, Oct. 29, 1974, abandoned.**

**This application Sept. 18, 1975, Ser. No. 614,603**

**Claims priority, application Japan, Oct. 30, 1973, 48-122521; Mar. 8, 1974, 49-27562**

**Int. Cl.² G03G *15/00***

**U.S. Cl. 355—3 R** **11 Claims**



1. An image transfer type electrophotographic copying apparatus which comprises:

a photoconductive member in the form of an endless belt having the opposite ends thereof joined so that at least three equally sized latent image carrying portions can be fitted along its circumferential length;

a plurality of rollers rotatably supporting said photoconductive member to guide said endless belt along a path approximately triangular in shape so as to provide a plurality of flat surfaces therealong;

means sequentially disposed along said photoconductive member including a corona charging means for uniformly charging said photoconductive surface, an instantaneous exposure means for forming an electrostatic latent image, a developing means for developing said latent image into a visible toner powder image, an image transfer means for transferring said toner powder image onto a copy paper fed from paper feeding means, and residual toner removing means for removing residual toner from said photoconductive surface;

said image transfer means being provided along one of said flat surfaces so that the transfer of said toner powder image is effected as the copy paper adheres electrostatically onto the photoconductive surface on said flat surface;

said endless belt having an acutely curved portion following said flat surface where said image transfer means is provided for separating said copy paper, after transfer of the image thereto, mainly by its own resilience;

a fixing means for heat fixing said toner powder image on said copy paper and disposed below said residual toner removing means;

a heat shielding means disposed above said fixing means and below said residual toner removing means for shielding heat from said fixing means and comprising means for forming an air flow acting as an air curtain between said fixing means and said residual toner removing means;

and a blower means associated with said fixing means for blowing air toward said acutely curved portion to assist said separation of the copy paper from said photoconductive surface and including means for changing the direction of air flow in the event of paper jamming in said fixing means so that air from said blowing means is directed into said fixing means.

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**4,025,181**

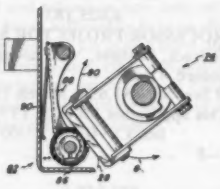
## SCREEN CLEANING DEVICE

**Sukumaran K. Menon, Webster, and Zenon Guran, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Jan. 7, 1976, Ser. No. 647,289**

**Int. Cl.² G03G *15/00***

**U.S. Cl. 355—3 R** **18 Claims**



1. An electrophotographic printing machine of the type having a photoconductive member, including:

a movable screen member located closely adjacent to the photoconductive member in the operative position and being remote therefrom in the inoperative position; and

means for cleaning particles from said screen member, said cleaning means being mounted for movement in unison with said screen member in a common plane and in a direction opposed thereto for removing particles therefrom during the relative movement therebetween.

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**4,025,182**

## TRANSFER APPARATUS FOR A COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE

**Narendra S. Goel, Henrietta, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Nov. 30, 1973, Ser. No. 420,747**

**Int. Cl.² G03G *15/22***

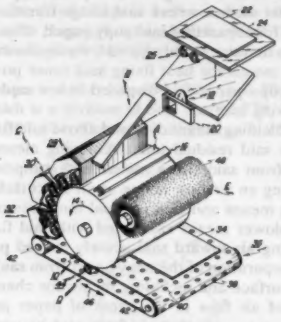
**U.S. Cl. 355—4** **8 Claims**

1. An apparatus for transferring at least two successive layers of charged particles from a movable particle bearing

member to a sheet of support material in superimposed registration with one another, including:

a porous support member having a generally planar surface for securing releasably thereto the sheet of support material, said support member being positioned closely adjacent to the movable particle bearing member;

means for reciprocating said support member such that the forward movement is in synchronism with the movement of the particle bearing member to transfer the charged particles thereon to the sheet of support material secured releasably to said support member and the return move-



ment locates said support member in position to initiate the transfer of the next successive layer of charged particles from the particle bearing member to the sheet of support material in superimprosed registration with the previously transferred layer of charged particles;

corona generating means positioned closely adjacent to said support member; and

means for energizing said corona generating means to spray ions through said support member onto the back surface of the sheet of support material to electrostatically attract the charged particles to the front surface thereof.

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**4,025,183**

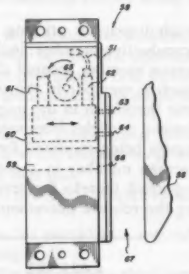
**CAMERA/PROCESSOR/PROJECTOR AND SUB-SYSTEMS**

**Arnold L. Pundsack, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Division of Ser. No. 451,654, March 15, 1974, Pat. No. 3,951,324. This application May 28, 1975, Ser. No. 581,524**

**Int. Cl.² G03G *15/00***

**U.S. Cl. 355—5** **12 Claims**



1. An apparatus for exposing, developing, and projecting a photosensitive web which includes holes along the longitudinal plane thereof, said apparatus comprising:

first drive means for advancing said web adjacent camera means, said first drive means advancing at least one individual segment of said web into approximate alignment with an aperture of the camera; said first drive means comprising first and second intermittent film drive means for driving the web through said camera means and an image projection means, respectively, and first and second continuous film drive means for driving the web through means for sensitizing and developing the web, respectively;

said camera means, including an aperture;

registration means for finely aligning at least one individual segment of the web with the aperture by moving the segment in the plane thereof from its approximate alignment position; said registration means comprising at least one registration pin adapted to engage at least one hole; and second drive means to advance and retract said pin along a single straight line, toward and away from the plane of the web, whereby said pin intermittently engages the holes of the web to thereby finely align at least one individual segment with said aperture by moving the segment in the direction of the force exerted on the hole walls by the sides of said pin; and a stationary support member mounted adjacent the path of the web; and a carrier member slidingly mounted on the support member and having attached thereto at least one said registration pin;

means for sensitizing the web before imagewise exposure by said camera means;

said image development means;

said image projection means;

a vacuum platen adjacent the path of the web opposite said aperture to hold said web in a substantially flat plane;

wherein the path of the web leads from the means for sensitization, to the camera means, to the development means, and then to the projection means; and between each of these means is a means for temporarily storing portions of the web comprising at least one stationary roller and one mechanically biased roller.

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**4,025,184**

**DEVELOPING ELECTRODE CONTAMINATION PREVENTION SYSTEM FOR ELECTROPHOTOGRAPHY**

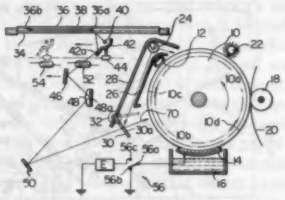
**Manabu Mochizuki, Tokyo, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan**

**Filed Aug. 5, 1975, Ser. No. 602,059**

**Claims priority, application Japan, Aug. 14, 1974, 49-92997; Aug. 29, 1974, 49-9169**

**Int. Cl.² G03G *15/10***

**U.S. Cl. 355—10** **19 Claims**



5. In an electrophotographic apparatus having a photoconductive member with an image portion and a non-image portion and a developing electrode, the photoconductive member being movable relative to the developing electrode, the combination comprising:

first means for electrically biasing the developing electrode when the image portion of the photoconductive member is adjacent to the developing electrode;

second means for charging the non-image portion of the photoconductive member to a voltage which is substantially equal to a voltage of a background portion of the image portion of the photoconductive member; and

third means for grounding the developing electrode when the non-image portion of the photoconductive member is adjacent to the developing electrode.

4,025,185

## APPLICATOR MEMBER

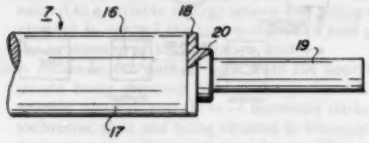
Lional Agustin Wilson, Redbourn, England, assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 14, 1975, Ser. No. 567,572

Claims priority, application United Kingdom, May 24, 1974, 23708/74

Int. Cl.² G03G *15/10*

U.S. Cl. 355—10 18 Claims




1. Apparatus which comprises a rigid surface and a resilient surface, said rigid surface adapted to move in contacting cooperation with said resilient surface for development of electrostatic images on said resilient surface, at least one of said surfaces being arcuate and at least one of the surfaces comprises a pattern of recessed and raised portions, a semi-rigid end extender located on at least one end of said rigid surface to reduce damage to said resilient surface by said rigid surface, said extender fitted in such a way that the surface of the end extender lies substantially in the same plane as the rigid surface.

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4,025,186

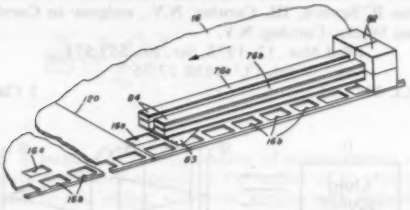
## WEB INDICIA FOR SYNCHRONIZING CONTROL APPARATUS FOR ELECTROPHOTOGRAPHIC APPARATUS UTILIZING DIGITAL COMPUTER

William E. Hunt, Jr.; John L. Connin, and Douglas J. Steelman, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 481,436, June 20, 1974, Pat. No. 3,914,047, which is a continuation of Ser. No. 402,223, Oct. 1, 1973, abandoned. This application Feb. 13, 1975, Ser. No. 550,104

Int. Cl.² G03G *15/00*

U.S. Cl. 355—14 14 Claims




1. An electrophotographic web member for use in an electrophotographic copying apparatus having actuatable work stations located along the path of movement of said web member for performing work operations on selected image areas of said web member upon actuation thereof by control means to form copies therefrom, said web member including at least three juxtaposed consecutively usable image areas, a first set of indicia on said web member comprising at least three spaced indicium disposed in predetermined positions on said web member to define said at least three juxtaposed consecutively usable image areas, said first set of indicia being located on said web member to be moved past sensing means for sending a first set of signals indicative of the image areas to the control means which controls actuation of the work stations, said web member further including second sets of indicia, each of said second sets of indicia including a fixed number of indicium disposed within each image area, said second sets of indicia being located on said web member for moving past sensing means for sending clock type signals to the control means indicative of the fixed number during the time interval between consecutive signals from said first set of indicia whereby the control means may count and store the signals from both sets of indicia to assure that the fixed number from said second sets is counted during the time interval and to thereby assure actuation of the work stations in a proper predetermined time sequence.

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4,025,187

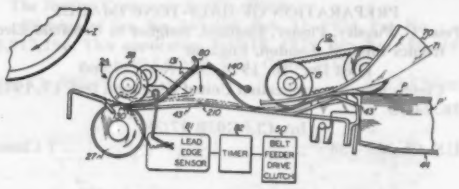
## BUCKLE CONTROL SYSTEM

Thomas N. Taylor, Rochester; Wayne F. Schoppe, Webster, and Thomas J. Mooney, Fairport, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 503,584, Sept. 5, 1974, abandoned. This application Feb. 2, 1976, Ser. No. 654,449

Int. Cl.² G03G *15/00*; B65H *9/06*, *9/20*

U.S. Cl. 355—14 29 Claims




1. In a sheet feeding apparatus for forming a buckle in a sheet including:

a stop member; means for feeding said sheet against said stop member to form a buckle in said sheet, sensing means for sensing the position of an edge of said sheet; and timing means responsive to said sensing means for timing a reference time interval from the sensing of said edge, said timing means being coupled to said feeding means and including means for stopping means upon the expiration of said reference time interval, said reference time interval being sufficiently long to allow said feeding means to form said buckle in said sheet; the improvement wherein, said apparatus further comprises:

means for adjusting the height of said buckle comprising, means for adjusting said timing means to allow said reference time interval to be changed.

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4,025,188

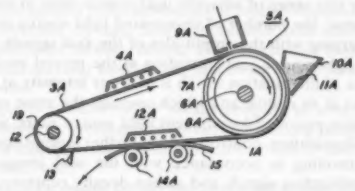
## PHOTOACTIVE DEVICE FOR XEROGRAPHY

Richard W. Radler, Jr., and Richard P. Millonzi, both of Marion, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 25, 1974, Ser. No. 526,644

Int. Cl.² G03G *15/00*

U.S. Cl. 355—16 16 Claims




1. A xerographic system comprising:

a removable electron- or hole-conductive matrix;

a plate, screen, flexible belt or axially rotatable drum com-

prising a base and at least one externally applied photoconductive coat and arranged in temporary contact with the matrix essentially only in an area of image exposure;

an electrostatic charging means arranged in charging relation to the free surface of the matrix out of contact with the photoconductive coat;

means for imagewise exposing the photoconductive coat while in contact with the matrix; and

means for developing or transferring and developing the resulting image.

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**4,025,189**

## PREPARATION OF HALF-TONE IMAGES

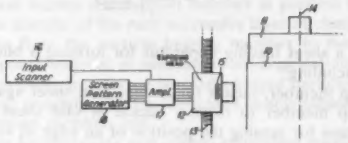
**Peter C. Pugsley, Pinner, England, assignor to Crosfield Electronics Limited, London, England**

**Filed Dec. 16, 1974, Ser. No. 533,460**

**Claims priority, application United Kingdom, Dec. 17, 1973, 58324/73**

**Int. Cl.² G03B *27/78***

**U.S. Cl. 355—38** **7 Claims**




1. Image reproducing apparatus comprising: exposure control means including an exposing head for exposing a light-sensitive record medium and means for obtaining relative line and frame scanning motion between the exposure head and the record medium, whereby the record medium is exposed along successive scanning lines, the exposing head including a row of light source units arranged to illuminate respective part-line areas of the record medium which together extend across the width of a scanning line of the record medium; the exposure control means further comprising, for producing a half-tone screened image or colour separation of an original in response jointly to an image density representing electric signal obtained by photoelectrically scanning the original and signals derived from a screen pattern generator and representing the variations of half-tone screen density across the scanning line, illumination control means including an illumination control device for each light source unit, the illumination control devices being responsive in common to the image-density representing signal and individually responsive to the signals from the screen pattern generator, whereby a single series or two series of adjacent light source units in the row is illuminated, the number of illuminated light source units in a series varying with the amplitudes of the said signals;

each light source unit providing at the record medium an area of illumination which is of lower intensity at its ends than at its middle and which overlaps the areas of illumination provided by adjacent light source units; and

the illumination control means further comprises means controlling in accordance with the said image-density representing signals and screen-density representing signals the intensity of illumination of at least one illuminated light source unit adjacent any unilluminated light source unit, any intermediate illuminated light source units in the said series remaining at a predetermined intensity.

**4,025,190**

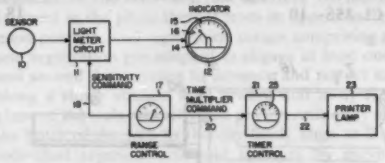
## EXPOSURE CONTROL SYSTEM FOR PHOTOGRAPHIC COPYING

**Marshall Hughes, P.O. Box 671, Lancaster, Calif. 93534**

**Filed Feb. 11, 1976, Ser. No. 657,021**

**Int. Cl.² G03B *27/32*; H01H *47/24*; G01J *1/44*; G03B *27/72***

**U.S. Cl. 355—68** **19 Claims**




1. An exposure control apparatus for printing photographic copies by means of a printer lamp comprising:

a. a light responsive sensor for sensing the light intensity at the plane where a photographic material is to be exposed;

b. an indicator;

c. a sensor circuit connecting said sensor to said indicator for providing an indication representative of the measured light intensity;

d. a range control coupled to said sensor circuit for changing the indications of said indicator in accordance with variations of the lens aperture and like parameters of the printer lamp; and

e. a timer control for generating a timing signal corresponding to the desired exposure time for exposing the photographic material, said timer control being connected to and responsive to said range control, said range control upon adjustment generating a signal for returning said indicator to preset mark while simultaneously varying the timing signal generated by said timer control to automatically control the exposure time in accordance with both the sensitivity of the photographic material and the setting of the lens aperture.

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**4,025,191**

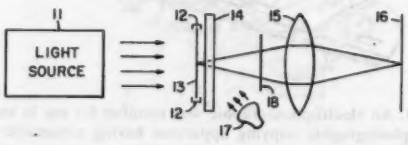
## PHOTOGRAPHIC CONTRAST ENHANCEMENT SYSTEM USING PHOTOCHROMIC GLASS

**Thomas P. Seward, III, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.**

**Filed Mar. 12, 1975, Ser. No. 557,571**

**Int. Cl.² G03B *27/76***

**U.S. Cl. 355—71** **1 Claim**




1. An optical system for processing a photographic negative to obtain a photographic print exhibiting enhanced contrast therefrom which comprises

light source means providing a light beam containing at least some bleaching light, the wavelength of which is such that it decreases the optical density of a selected thermally darkenable photochromic glass, said beam further containing at least some activating light, the wavelength of which is such that it activates a selected photographic printing medium,

a position for a photographic negative in the path of light emanating from the source, said position being selected so that light from the source transilluminates a photographic negative provided in said position,

a sheet of thermally darkenable optically bleachable photochromic glass in the path of light emanating from the source, said sheet being disposed behind and immediately adjacent to the position for the photographic negative so that light transilluminating a negative in said position transilluminates and forms an image of the negative on the sheet,

a transparent electrically-conductive tin oxide coating disposed on said sheet of thermally darkenable optically bleachable photochromic glass, said coating being connected to a variable voltage source and acting as a heating element to control the transmittance of said glass during the processing of said negative, and

lens means in the path of light from the source, said lens means being disposed behind the position for a photographic negative and sheet of thermally darkenable photochromic glass and being situated to intercept light from the source transilluminating a phtotgraphic negative and the sheet of thermally darkenable photochromic glass and to focus the intercepted light to provide a real image of the photographic negative, as modified by the sheet of thermally darkenable photochromic glass, on a selected photographic printing medium.

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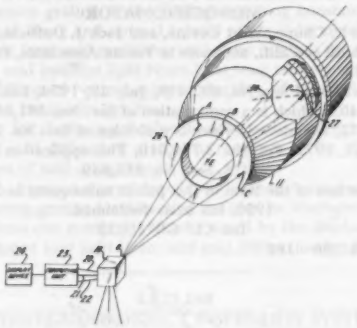
**4,025,192**

## OPTICAL MEASURING METHOD

**Karl Ragnar Schöldström; Holger Marcus; Lennart Nordström, all of Lidingo, and Nils Ståhl, Borlange, all of Sweden, assignors to AGA Aktiebolag, Lidingo, Sweden**

**Filed Nov. 25, 1975, Ser. No. 635,082**
**Int. Cl.² G01B *11/26***
**U.S. Cl. 356—152** **5 Claims**



1. A method of making a series of measurements of the relative position of a point on the surface of an object with respect to said object; said point moving with respect to a measuring instrument between said measurements; comprising the steps of:

a. measuring the location of first, second and third non-collinear reference points on said object with respect to said measuring instrument with said object in a first location relative to said measuring instrument;

b. measuring the location of said point on said surface with respect to said measuring instrument with said object in said first location with respect to said measuring instrument;

c. measuring the location of said first, second and third non-collinear reference points on said object with respect to said measuring instrument with said object in a second location with respect to said measuring instrument;

d. calculating the location of said point on said surface with respect to said first, second and third non-collinear reference points;

e. then calculating the location of said point on said surface with respect to said measuring instrument with said object in said second location with respect to said measuring instrument;

f. measuring the location of said point on said surface with respect to said measuring instrument with said object in said second location with respect to said measuring instrument; and

g. determining an estimate of wear of said surface by utilizing the calculation of step (e) and the measurement of step (f).

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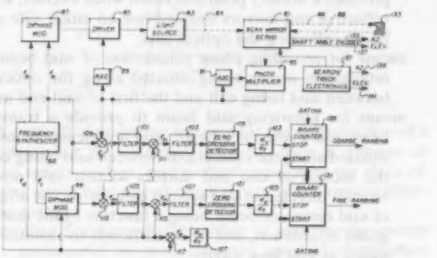
**4,025,193**

## APPARATUS SUITABLE FOR USE IN ORIENTING AIRCRAFT IN-FLIGHT FOR REFUELING OR OTHER PURPOSES

**C. Ray Pond, Federal Way; Lawrence W. Robinson, Seattle, and Patrick D. Texeira, Renton, all of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Division of Ser. No. 441,401, Feb. 11, 1974, Pat. No. 3,917,196. This application Feb. 18, 1975, Ser. No. 550,218**
**Int. Cl.² G01C *3/00*; G01B *11/26***
**U.S. Cl. 356—5** **13 Claims**



1. Apparatus suitable for use in in-flight refueling a receiver aircraft by a tanker aircraft via a refueling boom comprising:

1. first reflection means mounted on said receiver aircraft for receiving a portion of a transmitted electromagnetic beam and reflecting said portion of said electromagnetic beam back toward the source of said electromagnetic beam as a first reflected beam;

2. second reflection means mounted on said boom for receiving a portion of a transmitted electromagnetic beam and reflecting said portion of said electromagnetic beam back toward the source of said electromagnetic beam as a second reflected beam; and,

3. a sensor mounted on said tanker aircraft, said sensor comprising:

a. electromagnetic transmission means for transmitting an electromagnetic beam in a predetermined direction over a predetermined field of view;

b. electromagnetic receiving means for receiving the first and second reflected beams of electromagnetic energy reflected by said first and second reflection means mounted on said receiver aircraft and said boom when said receiver aircraft and said boom are in said field of view;

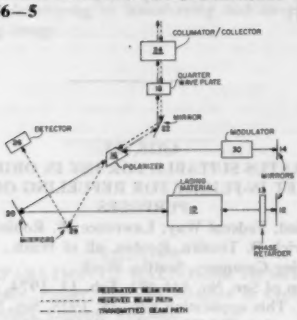
c. position determining means coupled to said electromagnetic receiving means for determining the positions of said first and second reflected beams in said field of view; and,

d. ranging means connected to said receiving means and said transmitting means for determining the time difference between transmission of said electromagnetic beam to, and reception of said first reflected beam from said receiver aircraft and, thus, the range between said receiver aircraft and said tanker aircraft.

## 4,025,194
## COMMON APERTURE LASER TRANSMITTER/RECEIVER

**Edward A. Teppo, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Mar. 22, 1976, Ser. No. 669,051**
**Int. Cl.² G01C** *3/08*; **H01S** *3/00*
**U.S. Cl. 356—5** **6 Claims**




1. A common-optics laser transceiver comprising:

a resonant laser cavity having a cell of lasing material which provides a linearly polarized beam when excited, and two reflective end mirrors situated one on either side of said lasing cell along the optical axis;

means for providing phase retardation of said beam, said retardation means being situated along the optical axis between said lasing cell and the first of said end mirrors;

means for polarizing said beam to provide a transmitted beam and a resonator beam, said polarizing means being situated along the optical axis between said lasing cell and the second of said end mirrors so that said resonator beam is directed to said second end mirror, the amplitude of said resonator beam being a function of the amount of phase retardation, and being sufficient to maintain resonance in said laser cavity;

means for circularly polarizing said transmitted beam, said polarizing means being situated along the optical axis of said transmitted beam; and

means for detecting a received beam, said received beam being that portion of said transmitted beam reflected from a target, the path of said received beam being coincident with the path of said transmitted beam through the circularly polarizing means to said polarizing means where said received beam is directed to said detecting means.

## 4,025,195
## IMAGE SUBTRACTION/ADDITION SYSTEM

**John F. Ebersole, Bedford, and James C. Wyant, Carlisle, both of Mass., assignors to Itek Corporation, Lexington, Mass.**

**Filed July 22, 1974, Ser. No. 490,479**
**Int. Cl.² G06K** *9/08*; **G01B** *9/02*
**U.S. Cl. 356—71** **4 Claims**

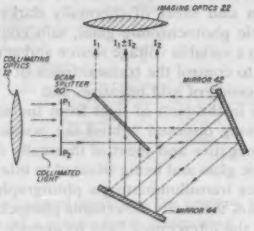
1. A system for optically adding or subtracting image detail of first and second images in parallel and comprising:

a. means for introducing a radiation beam into the system;

b. means for modulating a first portion of the radiation beam with said first image, whereby said first portion of the radiation beam contains image detail of said first image:

c. means for modulating a second portion of said radiation beam with said second image, whereby said second portion of the radiation beam contains image detail of said second image; and,

d. reflective means, having said first and second modulated portions of the radiation beam incident thereon, for superimposing the interference image detail in said first modulated portion of the wavefront with image detail in said second modulated portion of the wavefront, for destructively or constructively interfering common image detail in said first and second modulated wavefronts for optically subtracting or adding image detail in the first and second images, said reflective means includes a beam splitter means and mirror means, said beam splitter means transmitting part of said first portion of the radiation beam to said mirror means for reflection back to, and

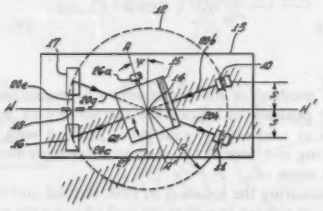



transmission by, said beam splitter means, said beam splitter means also reflecting part of said second portion of the radiation beam to said mirror means for reflection back to, and reflection by, said beam splitter means to superimpose it on said part of the first portion of the radiation beam which has been transmitted twice by said beam splitter means.

## 4,025,196
## ASYMMETRIC DOUBLE PASS GRATING MONOCHROMATOR

**Vernon L. Chupp, West Covina, and Jack J. Duffield, Monrovia, both of Calif., assignors to Varian Associates, Palo Alto, Calif.**

**Division of Ser. No. 492,499, July 29, 1974, Pat. No. 3,917,403, which is a continuation of Ser. No. 391,605, Aug. 27, 1973, abandoned, which is a division of Ser. No. 230,434, Feb. 29, 1972, Pat. No. 3,775,010. This application Mar. 3, 1975, Ser. No. 555,049**
**The portion of the term of this patent subsequent to Nov. 27, 1990, has been disclaimed.**
**Int. Cl.² G01J** *3/18*
**U.S. Cl. 356—101** **3 Claims**



1. In apparatus to perform correlation spectroscopy utilizing a zero dispersion monochromator that includes entrance, intermediate and exit slits, a ruled grating in the beam path between the entrance and exit slits and operable to disperse a beam of radiation incident thereon both prior and subsequent to radiation passage through the intermediate slit, there being a first axis which is parallel to the grating rulings, the entrance and exit slits symmetrically disposed at opposite sides of a plane bisecting and normal to a line extending between the entrance and exit slits, the plane also passing through the intermediate slit, the combination that includes:

a. said axis located to have intersection with and to extend at an angle Ψ relative to a normal to said plane that passes through said intersection thereby to substantially eliminate spectral overlap,

b. means providing an array of sets of slits adjacent the intermediate slit portion of the monochromator and,

c. the sets of slits in the array being successively movable into the focal plane at said intermediate slit position.

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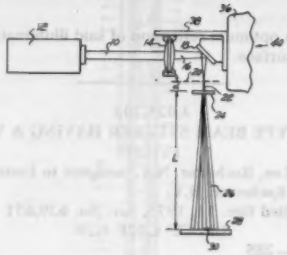
**4,025,197**

## NOVEL TECHNIQUE FOR SPOT POSITION MEASUREMENT

**Robert H. Thompson, Drayton Plains, Mich., assignor to The Bendix Corporation, Southfield, Mich.**

**Filed Aug. 11, 1975, Ser. No. 603,566**
**Int. Cl.² G01B 9/00**
**U.S. Cl. 356—111** **36 Claims**



**18.** An instrument for detecting the displacement of an object comprising:

means for generating a monochromatic beam of light of wavelength λ converging along an axis to a point focus at a predetermined point in space;

diffraction grating means having a grating constant *S* disposed along and normal to said axis a determinable distance from said predetermined point in space for diffracting said incident light beam in at least one plane to form a diffracted beam having a plurality of angularly separated composite beams;

means for displacing the location between said light beam and said diffraction grating in response to the displacement of said object; and

means disposed a predetermined distance behind said diffracting grating for detecting the angular displacement of at least one composite beam caused by the displacement between said light beam and said diffraction grating.

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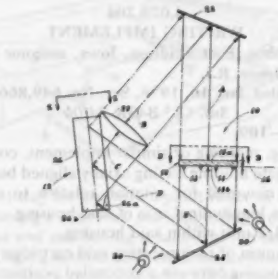
**4,025,198**

## OPPOSITE-SIDES OBJECT INSPECTION SYSTEM

**Thomas B. Hutchins, 310 N.W. Brynwood Lane, Portland, Oreg. 97229**

**Filed Mar. 17, 1976, Ser. No. 667,650**
**Int. Cl.² G01B 11/00**
**U.S. Cl. 356—163** **4 Claims**



**1.** Apparatus for projecting onto a portion of one side of an object in a viewing station a positionally aligned, unidirectionally reversed image of the corresponding portion of the opposite side of the object, said apparatus comprising

means defining a path for the bidirectional transmission of optical energy between such opposite-side corresponding portions of an object in said viewing station, and

image-reversing means positioned along said path between the path's ends for unidirectionally reversing and projecting toward one of said ends any image viewed at the opposite end, and vice versa.

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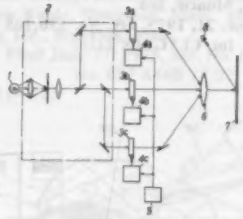
**4,025,199**

## OPTICAL COLOR MIXING METHOD

**Hitoshi Akami, Yokohama, Japan, assignor to Agency of Industrial Science & Technology, Tokyo, Japan**

**Filed Mar. 20, 1975, Ser. No. 560,188**
**Claims priority, application Japan, Apr. 8, 1974, 49-39708**
**Int. Cl.² G01T 3/10**
**U.S. Cl. 356—190** **8 Claims**



**1.** A method of preparing a recipe for the reproduction of a particular color on a coloring material from a number of coloring agents or dyes, said method comprising the steps of:

passing white light rays through a plurality of optical filtering means;

controlling filtration characteristics of said filtering means to correspond to predetermined spectral distribution characteristics of said coloring agents or dyes;

projecting the light rays which have passed through said filtering means onto said coloring material to produce a monitoring color thereon; and

modulating wavelength and amplitude outputs of said filtering means until said monitoring color simulates said particular color.

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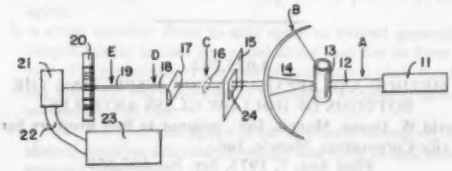
**4,025,200**

## SOFT AND LINE LASER

**Rashid A. Zeineh, 5742 W. Dakin St., Chicago, Ill. 60634**

**Filed Feb. 3, 1975, Ser. No. 546,513**
**Int. Cl.² G01N 21/06**
**U.S. Cl. 356—201** **5 Claims**




**1.** A soft laser densitometer comprising a light source emitting a laser beam, a cylindrical transparent member adapted to stretch said laser beam in a plane perpendicular to the cylindrical member, an opaque member in the path of the stretched beam disposed perpendicular thereto and having an opening adapted to pass a segment of said stretched beam through the opaque member, a cylindrical lens of positive focal length in the path of said segment of the stretched beam, the axis of said lens being in the same plane as said stretched beam and per-

pendicular to said cylindrical member, said cylindrical lens focusing said segment on an object to be scanned, and said segment having minimum width and variable length, said object containing separated bands for analysis and the plane of the focused segment being parallel with the plane of said separate bands, a photodetector behind said object adapted to detect transmitted light through said object or to the side thereof to detect flourescence or reflection, and a carriage for mounting said object adapted to have translational movement in a direction perpendicular to said segment, said photodetector providing an electrical signal to a chart recorder or computor to pattern analysis.

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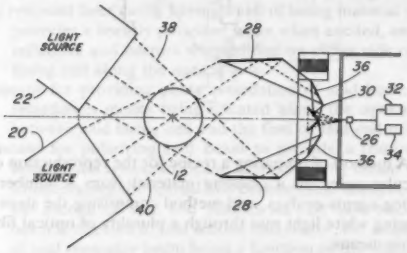
**4,025,201**

**METHOD AND APPARATUS FOR VIDEO INSPECTION OF ARTICLES OF MANUFACTURE BY DECUSSATE PATHS OF LIGHT**

**David W. Deane, Muncie, Ind., assignor to Ball Brothers Service Corporation, Muncie, Ind.**

**Filed Apr. 21, 1975, Ser. No. 570,105**
**Int. Cl.² G01N *21/32***
**U.S. Cl. 356—240** **10 Claims**




**1.** An optical system for use in glassware inspection comprising:

a light source for directing more than one path of light at an article to be inspected;

first reflecting means;

second reflecting means and optical receiving means, wherein said first reflecting means and said second reflecting means are positioned to direct said paths of light transferred through said article to said optical receiving means, wherein at least a first path of light and a second path of light impinge simultaneously upon said article at different angles, and wherein said optical receiving means comprises a video camera means for scanning said article and for producing a reject signal when a flaw is present in the article.

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**4,025,202**

**METHOD AND APPARATUS FOR INSPECTING THE BOTTOMS OF HOLLOW GLASS ARTICLES**

**David W. Deane, Muncie, Ind., assignor to Ball Brothers Service Corporation, Muncie, Ind.**

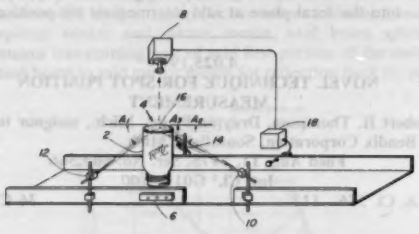
**Filed Aug. 7, 1975, Ser. No. 602,859**
**Int. Cl.² G01N *21/32***
**U.S. Cl. 356—240** **13 Claims**

**1.** Apparatus for inspecting the bottom of glassware comprising:

means for illuminating the inside bottom surface of said glassware; and

means for sensing illumination transmitted through said bottom surface

wherein said means for illuminating is positioned to direct illumination through a side wall of said glassware to illuminate said bottom surface and wherein the angle of incidence of said illumination on said bottom surface




results in optimum reflection of said illumination by said bottom surface.

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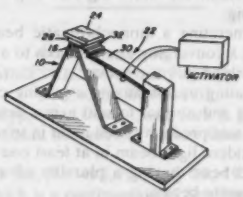
**4,025,203**

**MIRROR-TYPE BEAM STEERER HAVING A VIRTUAL PIVOT**

**James Kelly Lee, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Dec. 11, 1975, Ser. No. 639,671**
**Int. Cl.² G02F *1/29***
**U.S. Cl. 350—285** **9 Claims**




**1.** A beam steering apparatus comprising:

a. a mirror;

b. at least one support having a pair of flexible leg sections that are angled toward one another and are truncated by an interconnecting section extending therebetween, said leg sections having respective longitudinal axes which are arranged to intersect at a vertex;

c. means for fixing in place the diverging ends of said leg section sections;

d. means for fastening the said mirror on the vertex side of said interconnecting section; and

e. drive means for transmitting to said support a component of torque about the vertex of said longitudinal axes whereby said leg sections are caused to flex for effecting a rotation essentially about said vertex.

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**4,025,204**

**WRITING IMPLEMENT**

**Gerald E. Hobbs, Fort Madison, Iowa, assignor to Textron, Inc., Providence, R.I.**

**Filed Jan. 16, 1976, Ser. No. 649,866**
**Int. Cl.² B43K *24/06***
**U.S. Cl. 401—109** **14 Claims**

**1.** A writing, marking or similar implement, comprising

A. an elongate housing having axially aligned barrel and cap sections mounted for rotation relative to one another about the longitudinal axis of said housing,

B. a cartridge unit within said housing,

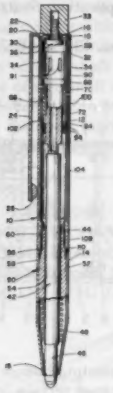
C. a mechanism of reciprocating said cartridge unit relative to said housing between a concealed position and a point exposed position, said mechanism being located within said housing and comprising

i. a first driving member rotatable with said barrel,

ii. a second driving member rotatable with said cap,
iii. said driving members being longitudinally fixed but rotatable relative to one another about the axis of said holder in response to rotation between said barrel and cap sections, and
iv. means for reciprocating said cartridge unit between its said concealed and point exposed positions in response to rotation between said driving members,

D. means for releasably coupling said mechanism and said housing whereby said housing may be selectively disassembled to permit removal or replacement of said cartridge unit, said coupling means comprising a generally tubular member extending from and threadedly connecting said mechanism to said barrel, and

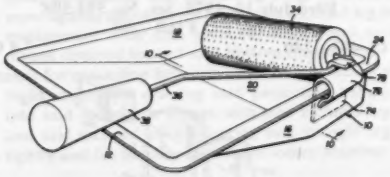
E. means for releasably locking said coupling means against inadvertent disassembly under the rotary forces generated during repeated actuations of said mechanism, said locking means comprising a tapered surface provided by said barrel and telescopically disposed in sliding wedged engagement with said tubular member.



## 4,025,205
## PAINT ROLLER SUPPORT FOR PAINT TRAY

**Gary D. Hawk, Iola, Kans., assignor to Harding Development Company, Clearwater, Fla.**

**Continuation-in-part of Ser. No. 549,639, Feb. 13, 1975, Pat. No. 3,947,135, which is a continuation-in-part of Ser. No. 380,603, July 19, 1973, Pat. No. 3,870,420. This application Dec. 1, 1975, Ser. No. 636,684**
**Int. Cl.² B44D** *3/12*
**U.S. Cl. 401—121** **8 Claims**



1. In a paint tray for use with a paint roller or the like, said paint roller having a bent wire rod supporting a paint applying portion at one end and having a handle at the other end, said paint tray including substantially coplanar front and rear ends, opposed side walls, a paint well adjacent to said rear end for storing a supply of paint, an integral inclined surface tapering upwardly from said paint well to said front end for rolling excess paint off said paint applying portion whereby excess paint flows into said well, and a peripheral upper flange, the improvement comprising:

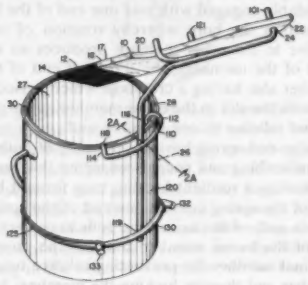
a small relatively thin support member defining a horizontally disposed, laterally opening slot vertically above said paint tray flange for retaining said bent wire rod and said paint tray together for supporting the paint applying roller above the paint well;

said support member having a base and first and second spaced apart legs extending outwardly from said base, said first and second legs defining said slot therebetween and said legs being vertically above said paint tray flange for retaining said bent wire rod therein.

## 4,025,206
## WIRE BRUSH HOLDER COUPLED TO CAN

**Steven Allen Rubin, Stoughton, Mass., assignor to Universal Products, Inc., Brockton, Mass.**

**Filed June 27, 1975, Ser. No. 591,016**
**Int. Cl.² A46B** *17/02*
**U.S. Cl. 401—123** **7 Claims**



1. For supporting a paint brush of the common type having a broad, substantially flat paint-applying head, a handle with a hole therethrough at its proximal end and a neck portion to engage the index finger of the user situated centrally along the line between said end and a compliant painting edge, over a common paint can of generally cylindrical shape, having when open at its top an inwardly turning upper rim defining the mouth of said can with the cylinder axis normally vertical, so that point dripping from said edge falls into said mouth, a brush caddy comprising,

a. A spine bent at its upper end to form a hook to engage said hole while said handle lies generally parallel to said spine,

b. a cross member fixed to said spine to extend generally perpendicular to said spine and along said rim to form a pair of arms having at the end of each arm a claw reaching inwardly and downwardly to engage an inward facing surface of said rim,

c. a yoke fixed to said spine as an upwardly extending U-shaped member adapted to engage said neck as said hook engages said hole,

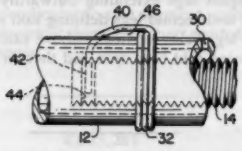
d. said caddy being proportioned relative to the size of said brush and the size of said can so that as applied to said can, said claws engage said rim, the lower end of said spine lies below and between said claws outside of said can, said spine bends outward away from said can axis above said claws with said hook turned generally upward to retain said brush by said hole steadied along said spine by the engagement of said yoke and said neck, the outward bending of said spine being such as to carry said painting edge over said mouth.

**4,025,207**

## POSITIVE LOCKING TURNBUCKLE

**Curtiss S. Johnson, Jr., Middle Haddam, Conn., assignor to C. Sherman Johnson Company, Inc., East Haddam, Conn.**

**Filed Sept. 15, 1975, Ser. No. 613,107**
**Int. Cl.² F16B 7/06**
**U.S. Cl. 403—46** **7 Claims**




1. A positive locking turnbuckle comprising:

a generally cylindrical barrel member having an internally threaded bore at one end and defining a slot extending longitudinally along the member coextensive with at least a portion of the bore and penetrating from the outer surface of the member radially through the wall of the member to the bore;

an elongated terminal member having one end adapted for coupling to another object and an opposite threaded end threadably engaged with said one end of the barrel member within the bore whereby rotation of one member relative to the other member produces an axial adjustment of the members, the threaded end of the terminal member also having a crosshole which periodically registers with the slot in the outer member as the members are rotated relative to one another; and

an annular coil spring having a plurality of coils completely circumscribing and snuggly engaging the barrel member and having a resilient locking tang formed by an extension of the spring coils at one end of the spring and bent transversely of the axis of the coils to project through the slot of the barrel member and into the crosshole of the terminal member for preventing relative rotations of the member and thereby locking the members together.

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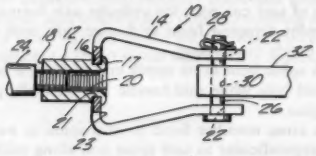
**4,025,208**

## CLEVIS

**Carroll F. Donahue, 1924 Russell, Dearborn, Mich. 48126**

**Filed Sept. 8, 1975, Ser. No. 611,128**
**Int. Cl.² F16C 11/06; F16D 1/12; F16J 1/16**
**U.S. Cl. 403—157** **6 Claims**




1. In a clevis comprising a U-member and a shank provided with ends respectively proximal and distal to said U-member, the improvement which comprises:

a. said shank and said U-member being formed from separate pieces;

b. said U-member provided with a hole in the bight thereof; said shank being tubular and formed of a deformable material;

c. said proximal end of said shank having an annular shoulder formed thereon which abuts against said U-member, said shank being positioned in said hole and the terminal portion of said proximal end extending through and beyond said bight, and

d. an outwardly extending flange formed by said terminal portion, said flange extending retrorsely into engagement with the periphery of said hole on the inner surface of said bight whereby said U-member is sandwiched between said flange and said annular shoulder to prevent both distal and proximal movement of said shank.

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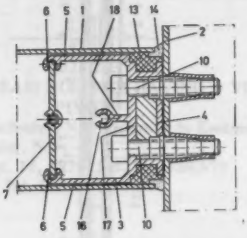
**4,025,209**

## DEVICE FOR CONNECTING HOLLOW SECTIONS

**Karl Vollenweider, Wagenhausen, Switzerland, assignor to Swiss Aluminium Ltd., Neuhausen am Rheinfall, Switzerland**

**Filed June 15, 1976, Ser. No. 696,194**
**Claims priority, application Switzerland, June 16, 1975, 7748/75**
**Int. Cl.² F16B 7/18**
**U.S. Cl. 403—189** **6 Claims**




1. A device for connecting hollow sections which are basically rectangular in cross section in which the connecting piece (3) inserted in one end of the hollow section (1) is a section cut off an extrusion, which is basically U-shaped in cross section perpendicular to the long axis of the extrusion, and practically completely fills the space inside the hollow section (1), and the web (17) of the connecting piece (3) has a basically rectangular space in it and the flanges (5) of the piece (3) have, facing each other at the free ends, lengthwise-running grooves which are preferably in cross section in the form of ¾ circles, whereby the connecting piece is secured to the base (2), on which the section (1) is to be fixed, by its web (17) if desired by screwing or by some other means, and whereby the hollow section is secured to the connecting piece by one single screw (9) and the connection joints are closed by a sealing agent (13) running round the connecting device and fitted into appropriate grooving on the outside of the web (17) of the connecting piece and if desired supplimented by a second (e.g. silicone) seal (14).

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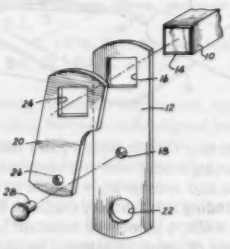
**4,025,210**

## SHAFT ASSEMBLY

**Carl B. Johnson, Pontiac, Ill., assignor to Pontiac Furniture Industries, Inc., Pontiac, Ill.**

**Filed July 10, 1975, Ser. No. 594,598**
**Int. Cl.² F16B 1/00**
**U.S. Cl. 403—240** **4 Claims**




1. The assembly with a shaft of a load member capable of

transmitting torque to and from said shaft in both directions about the axis of the shaft and of transmitting axial thrust to and from the shaft in both directions axially of the shaft in which

a. the shaft at the site of said assembly has a non-circular cross-sectional configuration,

a. and the load member has therein an aperture received on said shaft to transmit to said shaft a torque in at least one direction by engagement therewith at said aperture,

the assembly also including an attaching member mounted on said shaft adjacent to said load member and capable of transmitting torque to said shaft in the opposite direction by engagement of said attaching member with said shaft,

said load member and said attaching member being biased in said opposite torque-transmitting directions rotationally about the axis of said shaft with sufficient force to deform at least one of said shaft and said members at the site of contact between such member and shaft,

said members being fastened together while so biased to maintain the grip of said members upon said shaft.

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**4,025,211**

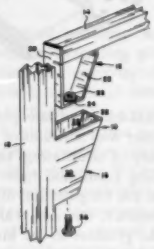
## DRAW-TIGHT CONNECTOR

**William E. Gump, 4311 SE. Belmont, Portland, Oreg. 97215**

**Filed Apr. 2, 1976, Ser. No. 672,866**

**Int. Cl.² B25G** *3/02*

**U.S. Cl. 403—361** **4 Claims**



1. A draw-tight connector means for connecting members together, comprising:

projection means including straight leg means, inclined leg means and bight means interconnecting said leg means, free ends of said leg means adapted to be secured to one of the members to be connected together;

receptacle means including said means having inclined means and bottom means, said side means and said bottom means adapted to be connected to another of the members to be connected together;

said projection means adapted to be positioned in said receptacle means with said straight leg means in engagement against the other member, said inclined leg means in engagement with said inclined means and said bight means directed toward said bottom means; and

means for extending between said bottom means and said bight means for drawing said projection means tightly into said receptacle means with said inclined leg means and said inclined means forcing said straight leg means tightly and frictionally against the other member.

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**4,025,212**

## CAN CONSTRUCTION DEVICE AND SYSTEM

**Alvin W. Block, 4449 Palma, Skokie, Ill. 60076**

**Filed Jan. 15, 1976, Ser. No. 649,426**

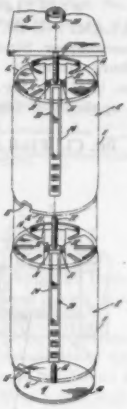
**Int. Cl.² B25G** *3/02*

**U.S. Cl. 403—361** **14 Claims**

1. An article of manufacture for connecting empty cans having a cylindrical side wall, recessed end members and chimes at the annular intersections thereof, said article comprising:

a disk-shaped member received in the end cavity between the chimes and recessed end members of two abutting axially aligned cans, said disk-shaped member having an outside diameter slightly less than the inside diameter of said chimes such that the outer periphery of said disk-shaped member serves to align abutting cans;

a threaded member projecting perpendicularly from one side of said disk; and



a spindle projecting perpendicularly from the other side of said disk, the outer end of said spindle having means defining a threaded longitudinally extending bore receiving the threaded member from a second such article such that a series of cans are connected by progressively inserting the spindle of a first said article through an opening in one end member of a can and threading the threaded member of a second said article into the first spindle an opening in the other end member of the can.

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**4,025,213**

## SHAFT COUPLED TO SURROUNDING HUB

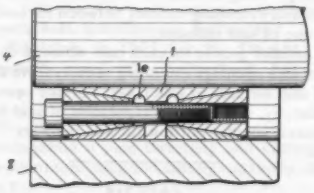
**Horst-Dieter Schäfer, Willich; Manfred Witzel, Moers; Paul Loosen, and Hermann Haarkötter, both of Krefeld, all of Germany, assignors to Ringfeder GmbH, Krefeld-Urdingen, Germany**

**Filed Dec. 8, 1975, Ser. No. 638,244**

**Claims priority, application Germany, Dec. 9, 1974, 2458229**

**Int. Cl.² F16B** *2/14*

**U.S. Cl. 403—370** **6 Claims**



1. An arrangement for coupling a shaft with a surrounding hub, comprising an inner annular member surrounding said shaft and having an outer circumferential face including two sections which conically taper in mutually opposite directions, and a radially outwardly extending collar intermediate and integral with said sections; a pair of separate outer annular members each surrounding one of said sections with clearance

and having an exterior cylindrical surface and an interior surface having a taper opposite to that of the section it surrounds to form therewith a wedge-shaped annular clearance, said outer annular members being independently movable and abutting from opposite axial ends against said collar; tension members received in the respective clearance; and means for drawing said tension members inwardly of the respective clearance to thereby force said inner member against the shaft and said outer members against the surrounding hub.

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**4,025,214**

## CLAMPING DEVICE

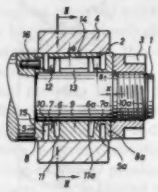
**Rudolf Spieth, Kennenburger Strasse 42, D 73 Esslingen (Neckar)-Kennenburg, Germany**

**Filed Jan. 16, 1976, Ser. No. 649,677**

**Claims priority, application Germany, Feb. 21, 1975, 2507456**

**Int. Cl.² F16B** *2/04*

**U.S. Cl. 403—370** **10 Claims**



1. A radially deformable clamping device comprising

a substantially cylindrical clamping bushing having an outer surface and an inner surface defining a central bore;

means defining first and second pairs of annular grooves in said bushing,

one groove of each pair extending radially inwardly from said outer surface and the other groove of each pair extending radially outwardly from said inner surface,

said grooves of each pair being axially spaced apart to define first and second bridge portions therebetween, the radial limits of said grooves forming flexible zones to render said bushing axially elastic, and

said pairs of grooves being axially spaced apart to define a central annular portion having an axial dimension at least as great as the axial dimensions of said grooves and said bridge portions;

means defining a plurality of bores extending axially into said bushing and through said central portion, said bores being disposed concentrically with respect to the central axis of said bushing and being equally circularly spaced apart; and

means defining a plurality of axially extending slot-like openings in said central portion, each of said slot-like openings being associated with one of said plurality of bores and extending radially between its associated bore and one of said surfaces,

said annular groove of each pair which is closest to said slot-like openings extending radially from the same one of said surfaces to which said slot-like openings extend whereby, upon axial compression of said bushing, said central annular portion radially deforms.

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**4,025,215**

## CORNER DOVETAIL JOINT

**Marshall B. Murdock, and Howard E. Bollinger, both of Lenoir, N.C., assignors to Broyhill Industries, Lenoir, N.C.**

**Filed Jan. 26, 1976, Ser. No. 652,559**

**Int. Cl.² F16B** *12/00*

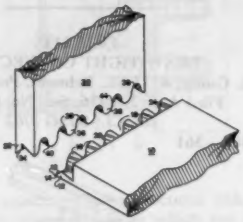
**U.S. Cl. 403—381** **1 Claim**

1. A corner joint construction comprising:

a. a pair of walls having inner and outer surfaces and being arranged perpendicular to each other and intersecting at adjacent end portions thereof;

b. each of said adjacent end portions include a dovetail locking means interfitting with each other when assembled, formed in the inner surface of said walls and extending only partially through the wall thickness thereof, said locking means further including

i. a transverse base surface extending partially through the thickness of a first one of said wall members adjacent to, but slightly spaced from the end thereof, a plurality of alternating, tapered tenons and mortises extending longitudinally from said base surface toward the end of said wall member, the larger cross-section of said tenons being nearest the outer end thereof whereby said tenons are generally frustro-conical in shape, the transverse cross-section of both said mortises and said tenons being curved in substantially a sinuous pattern, and the base of said tenons being spaced from the inner surface of said side wall to form an undercut;



ii. a longitudinal base surface portion intermediate the inner and outer wall surfaces of said second wall member; a plurality of alternating, tapered tenons and mortises extending from said base surface in a direction transverse to the longitudinal dimension of said second side wall member, the side walls of said tenons being separated the greatest at the inner surface of said second wall member and converging inwardly toward said base surface whereby said tenons are generally frustro-conical, the cross-section of said tenons and mortises being curved in substantially a sinuous pattern;

c. a concealing means comprising a bevel in both of said wall members extending from the outer corner of each wall inwardly to the termination of said dovetail locking means;

d. whereby said dovetail locking means is completely concealed from view when the outer or inner corner of the joint construction is observed.

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**4,025,216**

## KNOCKDOWN INTERLOCKING CONNECTORS

**Ronald Hives, St. Helens, England, assignor to Newage Kitchens Limited, Liverpool, England**

**Filed Mar. 18, 1976, Ser. No. 668,118**

**Claims priority, application United Kingdom, Mar. 19, 1975, 11344/75**

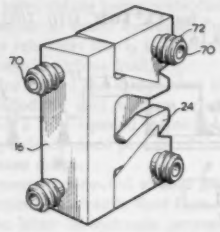
**Int. Cl.² B25G** *3/08*

**U.S. Cl. 403—381** **1 Claim**

1. A knockdown fitting for securely connecting elements of a piece of furniture together, said fitting comprising a pair of interlocking male and female members and means for securing these members to respective elements of said furniture, said male member being comprised of a laterally extending platform defined by a first distal surface and a first proximal surface, and a pair of spaced resilient projections extending in a longitudinal inwardly converging direction generally perpendicular to said first proximate surface from a location intermediate the ends of said first proximal surface, said projections being flexible and including intermediate their ends an out-

wardly extending barb having a second proximal surface thereby defining an inwardly extending cavity between the first proximal surface of said platform and second proximal surface of said barbs and wherein said projections each terminate in a respective second distal surface,

said female member being comprised of a block means having a third proximal laterally extending surface and a third distal surface and, intermediate the ends of said third proximal surface, an inwardly converging channel extending longitudinally from the third proximal surface through the third distal surface in a generally perpendicular direction to the third proximal and third distal surfaces, said channel being provided at a location intermediate its ends and on adjacent sides thereof, with a pair of opposing outwardly extending steps having a fourth proximal surface thereby defining a spaced inwardly protru-




sion between the third proximal and fourth proximal surfaces, said inwardly extending protrusion being of a similar configuration as the cavity of the male member but of slightly less longitudinal dimension, the lateral width from barb to barb being greater than the lateral width from step to step such that upon insertion of the projections of the male member into the channel of the female member said barbs snap fit onto said steps thereby to retain said protrusion securely within said cavity, retain said first proximal surface in contact with said third proximal surface and retain the second proximal surface in contact with the fourth proximal surface and whereby when said male member is fit into said female member there is open access to the second distal surface sufficient to allow the projections to be inwardly flexed for removal of the male member from the female member.

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## 4,025,217
## TUG UNIT FOR RAIL-MOUNTED SLIP-FORM PAVER

**Kenneth Alfred Cochrane, Matlock, England, assignor to Robert McGregor & Sons Limited, Manchester, England**

**Filed Jan. 8, 1976, Ser. No. 647,436**

**Claims priority, application United Kingdom, Jan. 8, 1975, 772/75**

**Int. Cl.² E01C** *11/16*

**U.S. Cl. 404—100** **7 Claims**

1. Apparatus for paving railway track comprising a self-propelled tug unit, a slip form paver adapted to be mounted on prelocated paving rails accurately set for line and level, a draw bar unit structure connecting the tug unit and the paver in spaced relation, a conveyor carrier by the draw bar structure for supplying fluid concrete in advance of the paver, a conforming plate on the paver for moulding the fluid concrete to a desired surface configuration, a movable rod separator disposed intermediate the spaced tug unit and paver for splitting continuous bundled steel rod reinforcement and spacing the rods across the width of the track for incorporation into the body of the concrete from the front, means on the paver for picking up the separated rod reinforcement and introducing the reinforcement into the concrete, and means on the paver for forming holes in the paved concrete for the permanent fixture of rail means.

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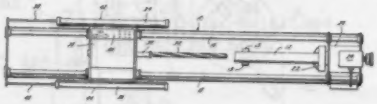
## 4,025,218
## DRILLING MACHINE

**Francis D. Logan, and Leonard M. Dybala, both of Houston, Tex., assignors to Camco, Incorporated, Houston, Tex.**

**Filed Nov. 10, 1975, Ser. No. 630,250**

**Int. Cl.² B23B** *39/04, 47/22*

**U.S. Cl. 408—11** **10 Claims**



1. A drilling machine comprising,

a base,

a pair of support ways supported from the base,

a workpiece holding chuck having an axis positioned in the middle of support ways,

a drill tool support slidably supported from the ways for longitudinal movement along the ways, the drill support including a drill spindle positioned in the middle of the support ways for holding a drill tool,

a hydraulic double acting piston and cylinder assembly connected to the tool support on each side of the drill spindle moving the tool support along the ways,

said drill spindle and said hydraulic piston and cylinder assemblies positioned in the same plane with the ways providing only an axial drilling force on the drill spindle thereby allowing a drill in the spindle to drill a straight hole in a workpiece held in the holding chuck, and

means applying fluid to the piston and cylinder assemblies including,

a valve connected to and moving with the drill tool support controlling the application of fluid to both sides of said pistons,

a movable means connected to and actuating the valve, and

a reversible stationary motor connected to and moving the movable means and actuating said valve

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## 4,025,219
## PIPE MACHINING APPARATUS, PARTICULARLY COMBINATION PIPE THREADING AND CUTTING MACHINE

**Gerhard Baumann, Schaffhausen, Switzerland, and Xaver Wuchner, Jestetten, Germany, assignors to George Fisher Aktiengesellschaft, Schaffhausen, Switzerland**

**Filed July 16, 1975, Ser. No. 596,446**

**Claims priority, application Switzerland, July 22, 1974, 10049/74**

**Int. Cl.² B23G** *1/24*

**U.S. Cl. 408—29** **8 Claims**

1. In combination a pipe threading and cutting machine with independent threading and cutting capability, comprising

a frame (2);

a pipe clamping section (11) to hold a pipe (12) in the machine along an axis (12') while being restrained against rotation;

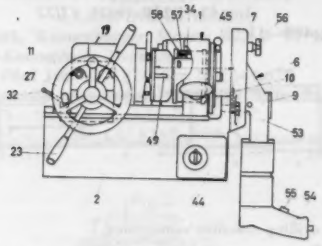
a motor-driven pipe threading section (1) having a threading tool means (5, 49) therein;

a pipe cutting section (6) having a pipe cutting tool means (10) therein, the pipe threading section (1) and the pipe cutting section (6) being located — with respect to the

axis (12') — the same side of the pipe clamping section (11) and spaced from each other by a predetermined distance along the axis (12')

guide means (30, 31) extending parallel to said axis (12') to guide the clamping section (11),

means for moving the clamping section over a distance which is greater than the distance (D) between the side of the threading tool means (5, 49) of the threading section (1) which faces the clamping section (11) and the side of the cutting tool means (10) of the cutting section (6) which faces the clamping section (11);




the pipe threading section (1) and the pipe cutting section (6) are separate, independently driven units;

means for pivotably and removably securing said pipe threading section (1) to the frame to pivot in a plane transverse to the axis (12') and includes an individual threader drive motor (3), means for removably securing the pipe cutting section (6) to the frame (2) of the machine and includes an individual cutter drive motor (54);

and means (32) are provided to secure the clamping section (11) to the frame (2) of the machine and fix the position of the clamping section on the guide means (30, 31) with respect to the frame (2).

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**4,025,220**

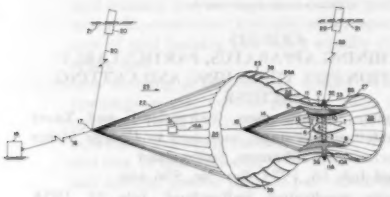
**FLUID CURRENT TURBINE WITH FLEXIBLE COLLECTORS**

**David F. Thompson, Box 183, Darby, Pa. 19023, and William J. Mouton, Jr., P.O. Box 10515, New Orleans, La. 70181**

**Filed June 11, 1975, Ser. No. 580,645**

**Int. Cl.² F04D** *29/60, 29/70*

**U.S. Cl. 415—7** **11 Claims**



1. In an energy extraction system for use in a fluid current flowing from upstream to downstream, said system comprising an axial flow turbine driven by said current positioned within the neck of a co-axial venturi nozzle and in combination therewith, a flexible, funnel shaped, current in flated, fluid-current collector, coaxial with said turbine, said collector being positioned upstream of said venturi nozzle, said collector having a large upstream open end, operative to collect a portion of said current, and a smaller downstream open end, the downstream open end having a diameter at least as large as the entrance to the venturi nozzle, and being positioned relative thereto to deliver at least a portion of the flowing fluid current into the entrance of the venturi nozzle,

means responsive to the fluid current flowing from upstream to downstream to inflate said collector and including means for attaching the upstream open end of the collector around its periphery comprising a divergent cone of many tether lines, said tether lines having a common upstream anchored cable.

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**4,025,221**

**AUTOMOTIVE GAS TURBINE POWER PLANT**

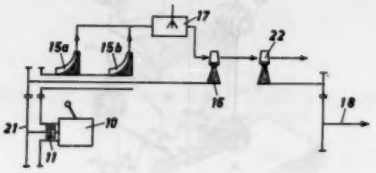
**Sven-Olof Kronogard, Lomma, Sweden, assignor to United Turbine AB and Co., Kommanditbolag, Sweden**

**Continuation of Ser. No. 471,173, May 17, 1974, abandoned. This application Mar. 3, 1976, Ser. No. 663,475**

**Claims priority, application Sweden, May 22, 1973, 7307157**

**Int. Cl.² F02C** *3/10, 7/02*

**U.S. Cl. 60—39.16 S** **6 Claims**




1. An automotive gas turbine power plant comprising: (a) a combustor, (b) at least one first turbine rotor, (c) at least one compressor rotor comprising a lightweight material relative to said first turbine rotor, (d) power transferring means including shafting and gears connecting said one first turbine rotor and said one compressor rotor, (e) variable transmission in said power transferring means dividing said power transferring means into a first portion running from the said variable transmission to the said one compressor rotor and a second portion running from the said at least one first turbine rotor to the said variable transmission, said first portion having a considerable less moment of inertia and the second portion, (f) at least one second turbine rotor connected to a power output shaft, and (g) control means permitting said one first turbine rotor and said second portion of the power transferring means associated therewith to rotate independently of said at least one second turbine rotor.

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**4,025,222**

**CONTROL VALVE UNIT FOR A HYDRAULIC SERVO MOTOR FOR A CONTROL VALVE OF A TURBINE**

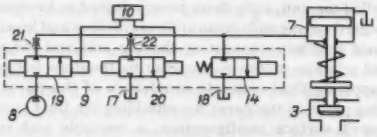
**Martin Hedström; Carsten Olesen, and Tyge Vind, all of Finspong, Sweden, assignors to Stal-Laval Turbin AB, Finspong, Sweden**

**Continuation of Ser. No. 458,294, April 5, 1974, abandoned. This application Nov. 10, 1975, Ser. No. 630,310**

**Claims priority, application Sweden, Apr. 24, 1973, 7305708**

**Int. Cl.² F01D** *17/04*

**U.S. Cl. 415—43** **1 Claim**




1. A valve system for regulating the supply of hydraulic fluid

to a servo motor which actuates the control valve between a turbine and its energy source, comprising:

a. turbine regulating means controlling the normal operation of the servo motor;
b. a source of hydraulic fluid;
c. passage means for circulating hydraulic fluid to and from said servo motor;
d. first valve means connected to said passage means for passing hydraulic fluid to said servo motor;
e. said first valve means being controlled by said turbine regulating means to supply hydraulic fluid to said servo motor to maintain said control valve open under normal operating conditions of the turbine and to interrupt the supply of hydraulic fluid in response to a predetermined decrease in turbine load;
f. second valve means connected to said passage means for draining hydraulic fluid from said servo motor;
g. said second valve means being controlled by said turbine regulating means to drain hydraulic fluid to close said control valve relatively slowly in response to a predetermined decrease in turbine load;
h. said first valve means and said second valve means both being controlled by said turbine regulating means to assume either a fully opened position or a fully closed position for predetermined periods of time in response to normal pressure drops;
i. third valve means connected to said passage means for separately draining hydraulic fluid from said servo motor to relieve the latter of hydraulic pressure rapidly in response to an abnormal decrease in turbine load with consequent rapid closing of the control valve;
j. said third valve means being maintained in closed position during said predetermined normal pressure drops and being actuated into drainage position upon a predetermined abnormal pressure drop in said passage means;
k. said first valve means and said second valve means including means for restricting the passage of hydraulic fluid relative to the passage of hydraulic fluid through said third valve means;
l. said restriction means being calibrated to provide a predetemined time lapse for closing and opening the control valve during normal operating conditions of the turbine.

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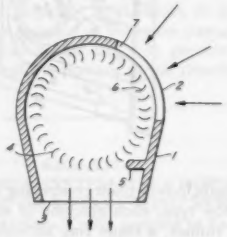
**4,025,223**

## FAN ARRANGEMENT

**Klaus Anders, Fischbach, and Heinz-Werner Faatz, Usingen, both of Germany, assignors to Braun Aktiengesellschaft, Frankfurt am Main, Germany**

**Filed Nov. 11, 1975, Ser. No. 631,152**
**Claims priority, application Germany, Dec. 4, 1974, 2457183**
**Int. Cl.² F04D** *5/00, 29/66*
**U.S. Cl. 415—54** **15 Claims**




1. In a fan arrangement, a combination comprising a housing having inlet means for admitting air, and outlet means spaced from said inlet means and operative for discharging air from said housing; a rotor mounted in said housing for rotation about an axis, said rotor having straight-edged impeller blades which sweep past said inlet and outlet means to thereby draw air through said inlet means into the interior of said housing and for thereupon expelling the drawn-in air through said outlet means towards the exterior of said housing; and means for reducing noise generated by incoming air which passes through said inlet means, said reducing means including an impact edge partially bounding said inlet means and being elongated on said housing so as to form an angle with respective straight-edged blades as the latter sweep past said inlet means.

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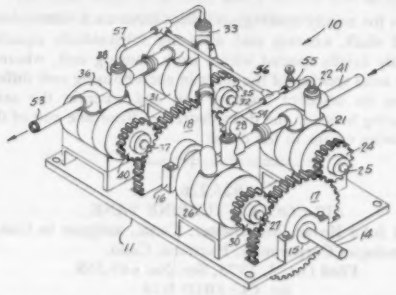
**4,025,224**

## MULTIPLE AIR MOTOR DRIVE UNIT

**Raymond E. Starbard, 190 Hoffman Ave., Auburn, Calif. 95603**

**Filed Dec. 2, 1975, Ser. No. 637,064**
**Int. Cl.² F01D** *13/00*
**U.S. Cl. 415—60** **1 Claim**




1. An air motor power unit comprising a base, a plurality of air motors secured to the base, each of said air motors having an air inlet fitting and an air exhaust fitting, a shaft in each of said air motors driven thereby, gear means connecting said motor shafts to a common drive shaft including a spur gear on the shaft of each of said air motors, a central shaft extending parallel to the shafts of each of said air motors, and spur gear means on said central shaft meshing with the gears on the shaft of each of said air motors, conduit means connecting the exhaust fitting of one of said air motors to the inlet fitting of the next succeeding air motor interconnecting all of said air motors, means to balance the air pressure on the inlet side of each of said air motors comprising a conduit interconnecting the inlet fittings of all of said air motors, said conduit being substantially smaller in diameter than said conduit means, a control valve in said conduit for controlling the flow of air therethrough, a pressure regulator controlling the air pressure reaching the inlet fitting of the first of said air motors, and a throttle valve between said pressure regulator and the first of said air motors.

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**4,025,225**

## DISC PUMP OR TURBINE

**Donald S. Durant, Warren, Mich., assignor to Robert R. Reed, Warren, Mich., a part interest**

**Filed Aug. 4, 1975, Ser. No. 601,465**
**Int. Cl.² F03B** *5/00*
**U.S. Cl. 415—90** **1 Claim**

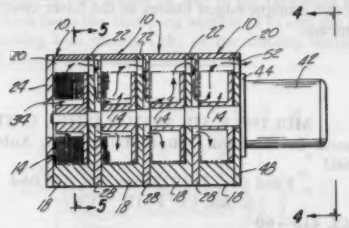
1. An energy translating deviçe comprising

a housing means having an inlet means and an outlet means, said housing means comprising a plurality of housing units, each of said housing units having an inlet and an outlet with the outlet open to the inlet of the adjacent housing unit, and a deflector detachably connected to each of said housing units, said deflector having a concave axially extending wall portion for deflecting a pe-

ripheral fluid discharge axially into the inlet of the next adjacent housing unit,

a shaft extending through and rotatably mounted with respect to each housing unit in said housing means,

at least three discs mounted to said shaft within each of said housing units in said housing means, and



means for axially spacing said discs from each other along said shaft, wherein said discs are substantially equidistantly axially spaced within each housing unit, wherein the axial spacing of the discs in each housing unit differs from its adjacent housing unit and wherein the axial spacing between the discs decreases from one end of the housing means to the other.

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**4,025,226**

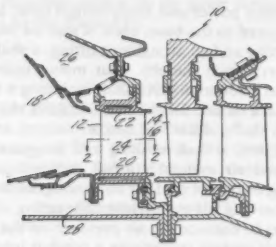
**AIR COOLED TURBINE VANE**

**Edward John Hovan, Manchester, Conn., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Oct. 3, 1975, Ser. No. 619,558**

**Int. Cl.² F01D** *5/18*

**U.S. Cl. 415—115** **7 Claims**



1. In a turbine vane having a spanwise extending cavity into which cooling air is flowable from opposing ends of the cavity and having a leading edge which has incorporated therein means for distributing cooling air from the cavity over the exterior surface of the leading edge, the improvement comprising:

a baffle disposed within the cavity at a substantially mid-span location for reducing the local velocity of the entering cooling air by preventing the cross flow of cooling air from one end of the cavity to the other.

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**4,025,227**

**VARIABLE AREA TURBINE**

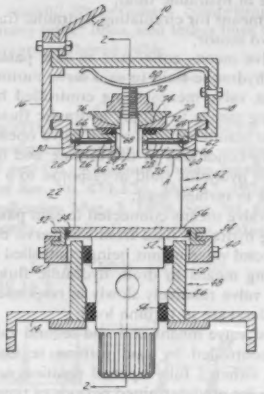
**Paul Burton Greenberg, Manchester, and Harry John Kit, Wethersfield, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed June 30, 1975, Ser. No. 591,555**

**Int. Cl.² F01D** *17/14*

**U.S. Cl. 415—160** **16 Claims**

1. In a gas turbine engine having a flow path for working medium gases extending through the engine and including a variable area nozzle comprising a plurality of rotatable guide vanes disposed between the inner engine case and the outer engine case, means attached to the outer case for cantilevering free of radial restraint said guide vanes from the outer case



to support the vanes under axial loads exerted by the working medium gases on the vanes and means attached to the inner case for radially restraining the vanes under radial pressure loads exerted by the working medium gases on the vanes.

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**4,025,228**

**HYDRAULIC PLANT**

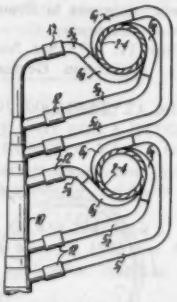
**Jean Lieber, Geneva, Switzerland, assignor to Ateliers des Charmilles S.A., Geneva, Switzerland**

**Filed June 24, 1975, Ser. No. 589,799**

**Claims priority, application Switzerland, July 9, 1974, 9399/74**

**Int. Cl.² F01D** *1/08*

**U.S. Cl. 415—205** **1 Claim**



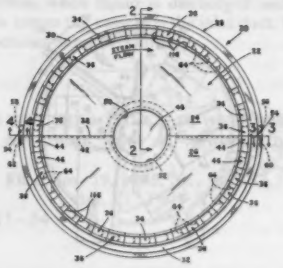
1. A hydraulic power plant comprising a pair of machines of the radial flow type, each machine of said pair of machines including a runner, a blade ring surrounding said runner, a pressure pipeline, means connecting said blade ring to said pressure pipeline, said connecting means comprising a plurality of partial volutes each surrounding a different portion of the periphery of said blade ring, a plurality of pipes each connecting one of said partial volutes with said pressure pipeline and a valve for each pipe thereby providing substantially equal distribution of the hydraulic stresses around said blade ring.

4,025,229

## DIAPHRAGM WITH CAST NOZZLE BLOCKS AND METHOD OF CONSTRUCTION THEREOF

William W. Browning, and Donald J. Legacy, both of Wellsville, N.Y., assignors to Turbodyne Corporation (Steam Turbine Div.), Wellsville, N.Y.

Filed Nov. 14, 1975, Ser. No. 631,891
Int. Cl.² F01D 1/02
U.S. Cl. 415—216 8 Claims



1. A turbine diaphragm assembly comprising;
a. a generally cylindrical hub,
b. a retaining ring surrounding and in spaced relation to the cylindrical hub to form an arcuate nozzle block mounting groove therebetween,
c. an arcuate array of unitary investment cast nozzle blocks disposed in side by side relation in said arcuate nozzle block mounting groove,
d. each of said unitary investment cast nozzle blocks including,
1. an inner shroud segment,
2. an outer shroud segment, and
3. at least one nozzle blade connected to and formed unitarily with the inner shroud segment and outer shroud segment,
e. said nozzle blocks in assembled position in said arcuate nozzle block mounting groove having the inner shroud segment welded to the cylindrical hub and the outer shrouded segment welded to the retaining ring,
f. each inner shroud segment and outer shroud segment on each of said unitary investment cast nozzle blocks having means respectively thereon to enable each of said respective nozzle blocks in assembled position in said arcuate nozzle block mounting groove to interfit with each adjacent ones of said nozzle blocks,
g. each nozzle blade on each of the respective nozzle blocks having an exit edge which is substantially radially disposed relative to the axis of said cylindrical hub, and
h. each nozzle blade in assembled position with the nozzle blade of the next adjacent nozzle block to define in said cylindrical hub a plurality of fluid flow passages having a predetermined curvilinear shape to provide a substantially constant uniform positive throat therebetween.

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4,025,230

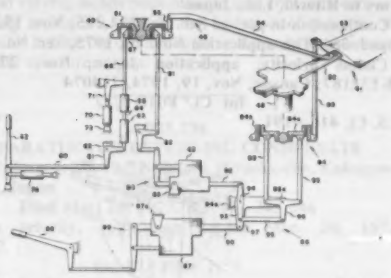
## ADVANCED CONTROL SYSTEM FOR A ROTOR AND/OR A COMPOUND OR ROTARY WING VEHICLE

Howard Kastan, Northridge, Calif., assignor to Lockheed Aircraft Corporation, Burbank, Calif.

Filed May 13, 1976, Ser. No. 686,251
Int. Cl.² F01D 7/00
U.S. Cl. 416—18 15 Claims

1. A sensing means which feeds back to a gyroscope a true signal from flapping bending activity of a rotor blade, the gyroscope then returning a correcting feathering motion to the rotor blade,

said sensing means including one end element for measurement of pure flapping motion of a fixed hub arm to which



the rotor blade is secured and a second end adapted for operative connection to the gyroscope.

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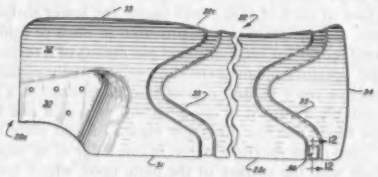
4,025,231

## PROPELLER FAN CONSTRUCTION

Joseph F. Kochevar; Richard M. Rath, both of Dundee, and Walter W. Claffey, Barrington, all of Ill., assignors to Revcor, Inc., Carpentersville, Ill.

Filed Nov. 26, 1975, Ser. No. 635,765
Int. Cl.² F04D 29/38
U.S. Cl. 416—144 6 Claims



1. In a propeller fan construction, an impeller therefor comprising a spider member mountable for rotation about a central axis, said spider member having a plurality of planar marginal portions arranged symmetrically relative to the central axis; a plurality of elongated blades formed of sheet material and having corresponding inner ends thereof provided with planar segments fixedly mounted in face-to-face relation on the planar marginal portions of said spider member, corresponding outer ends of said blades being spaced radially outwardly from the periphery of said spider member, each blade being provided with an elongated embossment disposed intermediate the inner and outer ends of said blade and extending from an elongated edge of the blade angularly relative to the longitudinal axis of said blade, each embossment forming a recess on one surface of the blade; and weighted elements in gripping engagement on selected blades and being aligned with predetermined embossments thereof, each weighted element including a pair of resilient interconnected legs grippingly straddling an edge portion of the selected blade, one leg of the pair being disposed within the embossment recess.

**4,025,232**

## TURBOMACHINE ROTOR ASSEMBLY

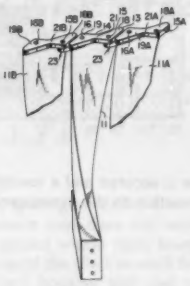
**Tetsu Imai, and Kazuo Ikeuchi, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan**

**Continuation-in-part of Ser. No. 524,275, Nov. 15, 1974, abandoned. This application Nov. 20, 1975, Ser. No. 633,929**

**Claims priority, application Japan, Nov. 27, 1973, 48-132187; Canada, Nov. 19, 1974, 214074**

**Int. Cl.² F01D** *5/22*

**U.S. Cl. 416—191** **9 Claims**



1. A rotor arrangement comprising: a plurality of rotor blades arranged adjacent to each other, each of said rotor blades including a tip portion, a first ledge provided on each of said rotor blades at said tip portion, a second ledge provided on each of said rotor blades at said tip portion, said first and second ledges on each of said rotor blades extending outwardly in opposite directions from respective sides of said rotor blades, each of said first and second ledges having an upper surface defining the most external periphery of the rotor arrangement and a lower surface facing the rotor blades, means arranged between adjacent ledges for connecting adjacent rotor blades to each other so as to permit a relative rotation of the connected rotor blades with respect to each other during an operation of the rotor arrangement, said connecting means including a plurality of individual flat plates with a single flat plate extending between adjacent ledges of adjacent rotor blades, at least two spaced pin means provided on a surface of each of said plates facing the lower surface of the ledges, and aperture means provided in each of said first and second ledges for receiving said pin means of a respective plate, said aperture means extending substantially radially of the respective rotor blades, one of said pin means of a plate being rotatably mounted in one aperture means of one ledge of a rotor blade and the other pin means of said plate being loosely fitted in an aperture means in one ledge of an adjacent rotor blade with the surface of the plate upon which said pin means are provided being maintained in contact with the lower surface of each of the adjacent ledges.

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**4,025,233**

## ROTOR FOR WIND-DRIVEN MACHINE

**Kevin E. Moran, 212 Lippincott Ave., Riverton, N.J. 08077**

**Filed Apr. 12, 1976, Ser. No. 676,535**

**Int. Cl.² F03D** *1/06*

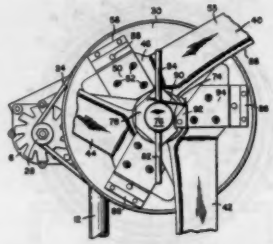
**U.S. Cl. 416—207** **5 Claims**

1. A rotor for a wind-driven machine including a hub, means for mounting said hub for rotation about an axis, a plurality of airfoils mounted on said hub and extending outwardly from said hub in a substantially radial direction with respect to said axis, and means for removably securing the roots of said airfoils to said hub at a predetermined fixed pitch, said securing means comprising:

first means on each airfoil adjacent the innermost end of one of the edges thereof for attachment to the hub at a first location thereon at a first radial distance from said axis;

second means on each airfoil adjacent the innermost end of the other edge thereof for attachment to the hub at a second location thereon said second location being both radially and axially remote from said first location;

first means on said hub for securing the said first means on each airfoil against axial, circumferential and radial outward movement with respect to said hub; and



second means on said hub for securing the said second means on each airfoil against axial, circumferential and radial movement with respect to said hub, said second means comprising means providing a first radially extending surface on said hub, means providing a second radially extending surface, and cooperating threaded means coaxial with said axis for urging said surfaces toward each other to secure said second means on each airfoil between said surfaces; and

said first means on said hub being both axially and radially remote from said second means on said hub.

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**4,025,234**

## APPARATUS FOR OBTAINING ARTIFICIAL GRAVITY IN LIQUIDS

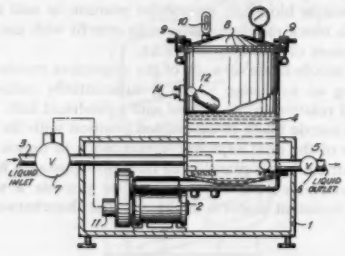
**Juan Ramoneda Sibidi, C/. Quevedo No. 56, Sabadell (Barna), Spain, assignor to Mecano Quimica S.A., Barcelona, Spain**

**Filed Feb. 20, 1975, Ser. No. 551,385**

**Claims priority, application Spain, Feb. 21, 1974, 423474**

**Int. Cl.² F04B** *49/00;* **F04F** *1/18*

**U.S. Cl. 417—28** **4 Claims**



1. Apparatus for supplying liquid at constant pressure comprising a storage vessel having an inlet and an outlet, said outlet being adapted for connection to a utilization device, an inlet conduit connected to the inlet of the vessel, a pump connected in said inlet conduit for pumping liquid from a supply thereof to said inlet of the vessel, a valve in said inlet conduit upstream of the pump for preventing reverse flow of liquid to the liquid supply when the pressure in the utilization device exceeds the pressure due to the liquid height in the vessel, said valve being coupled to said pump to be opened and closed in accordance with starting and stopping thereof, an air inlet duct coupled to said vessel and including regulat-

ing means for adjusting the air pressure from zero to a predetermined maximum, said air inlet duct maintaining a constant air pressure in said vessel to maintain the liquid therein at a given constant pressure, an air outlet duct including an escape valve connected to the vessel, and a gage in said outlet duct whereby when liquid enters the vessel and there is no liquid discharge therefrom or the liquid discharge is less than the amount of entering liquid, the air escapes by said escape valve, thereby avoiding increase in air pressure inside the vessel whereas, when liquid is discharged and the pump is stopped, air enters the vessel via the inlet duct, thereby avoiding any decrease in air pressure.

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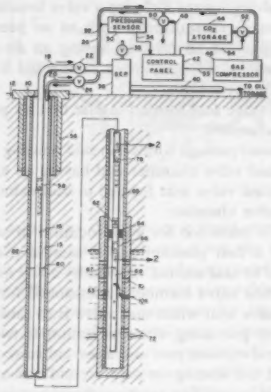
**4,025,235**

## SYSTEM FOR IMPROVING OIL WELL PRODUCTION

**Joseph S. Newbrough, 1869 Wedgemere, El Cajon, Calif. 92020**

**Filed Nov. 19, 1975, Ser. No. 633,370**
**Int. Cl.² F04F 5/14**
**U.S. Cl. 417—54** **12 Claims**




1. In a system for producing oil fluid from an oil well having casing and tubing positioned therein with an annulus space therebetween and with oil fluids moved by an oil producing formation to a given height in the casing annulus and tubing, comprising,

packer means for sealing the upper annulus volume from a lower annulus volume at the oil producing formation,

aperture means in the tubing above the packer means and below the normal oil fluid level in the annulus for passing oil fluids to and from the upper annulus volume to the tubing volume,

check valve means in the tubing adjacent to or below the packer means for passing fluid from the formation to the tubing and annulus volumes and preventing reverse fluid flow,

valving means for initially injecting a heavier than air, inert gas into the annulus, and then injecting a gas under pressure into the annulus volume against the layer of inert gas forcing the oil fluid therein downwardly in the annulus and through the aperture means into the tubing volume and upwardly in the tubing volume,

means cooperating with said valving means for slowly releasing the gas pressure in said upper annulus volume allowing oil fluid to flow through said check valve means into said tubing and through said aperture means into said upper annulus volume with the heavier than air, inert gas thereon,

control means for cyclically controlling the valving means in injecting the fluid under pressure into the upper annulus volume and opening said valving means and releasing said releasing means and the fluid under pressure,

and said valving means responsive to said control means and having means for ceasing the injection of gas into the annulus before the oil fluid level in the annulus is lowered to said aperture means.

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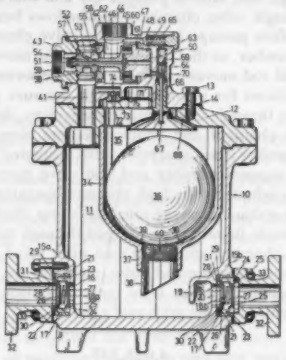
**4,025,236**

## APPARATUS FOR RETURNING CONDENSATE

**Katsuji Fujiwara, No. 191, Nishitani, Hiraoka-cho, Kakogawa, Hyogo, Japan**

**Filed Mar. 26, 1973, Ser. No. 345,246**
**Claims priority, application Japan, Mar. 24, 1972, 47-35407**
**Int. Cl.² F04F 1/06**
**U.S. Cl. 417—128** **8 Claims**



1. An apparatus for accumulating condensate and for directing the condensate to a source, such as a boiler, comprising wall means forming a closed condensate sump chamber, said wall means including a condensate inlet to said sump chamber and a condensate outlet from said sump chamber, a float housing forming a float chamber positioned within and spaced above the base of said sump chamber, a float positioned within and freely vertically displaceable within said float chamber, a tubular member secured to said float housing and extending downwardly therefrom within said sump chamber and providing a first passageway communicating between said float chamber and said sump chamber, a check valve positioned within each of said inlet to and said outlet from said sump chamber, said wall means including a cover closing the upper end of said sump chamber, wherein the improvement comprises that said cover forms a single valve chamber having a high pressure operating gas supply port and a high pressure operating gas exhaust port located at spaced apart positions and each communicating with said single valve chamber, and a high pressure operating gas supply-exhaust passage formed by said cover member communicating between said sump chamber and said single valve chamber, said cover including a second passageway bypassing said valve chamber and communicating between said supply port and said float chamber, a single valve unit located within said single valve chamber and including a displaceable valve support member extending through said single valve chamber and positioned in the path therethrough between said supply port and exhaust port, a valve member mounted on said valve support member and displaceable therewith and having two spaced sealing surfaces arranged to contact two separate surfaces of said valve chamber for controlling flow therethrough from said supply port and said exhaust port to said supply-exhaust passage, a bellows bearing member located within said valve chamber and spaced from said exhaust port, a bellows sealingly connected to said bellows bearing member and to said valve support member and forming a bellows chamber located within said

bellows and between said valve support member and bellows bearing member, said valve support member forming a third passageway having a restricted flow path communicating between said bellows chamber and said exhaust port, said cover forming a fourth passageway communicating between said second passageway and said valve chamber, means blocking the path of flow through said second passageway to said float chamber, a pilot valve associated with said blocking means within said second passageway for opening and closing the flow therethrough between said supply port and said fourth passageway, said blocking means in said second passageway including an upwardly extending displaceable rod which has its lower end located within said float chamber and its upper end located within said second passageway so that said rod is displaceable by said float as it rises upwardly within said float chamber and in turn displaces said pilot valve within said second passageway for admitting flow from said supply port through said second passageway and fourth passageway into said single valve chamber, said bellows bearing member forming a flow passage between said valve chamber and said bellows chamber, so that in response to the movement of said float as said rod moves said pilot valve between its open and closed positions for introducing high pressure gas from said supply port through said second passageway, fourth passageway, valve chamber and bellows bearing member into said bellows chamber when said pilot valve is opened for displacing said valve support member and said valve member mounted thereon for admitting the high pressure operating gas through said supply-exhaust passage into said sump chamber whereby the condensate therein is discharged through said outlet from said sump chamber and when said pilot valve is closed said valve support member and valve member are positioned so that said sump chamber is in communication through said supply-exhaust passage with said exhaust port.

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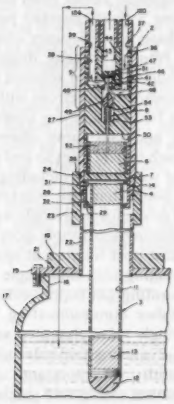
**4,025,237**

## LATCHING MAGNETIC LEVEL SENSOR

**George F. French, 4009 Linden St., Oakland, Calif. 94608**

**Filed Oct. 22, 1975, Ser. No. 624,608**
**Int. Cl.² F04F** *1/06*
**U.S. Cl. 417—131** **3 Claims**



**1.** A latching and automatic reset magnetic two-level liquid sensor providing a piloted pneumatic-ejector system comprising:

a. a housing including second magnet retaining means and sensor retaining means;

b. sensor means including a selected downwardly biasing means and a buoyancy means repetitively responsive to recurrent vertical elevation change between a first and a second preselected elevation;

c. force means generating said elevational changes and exerting a gradually increasing lifting force on said sensor means in a first mode and successively exerting a gradually decreasing lifting force in a second mode;

d. a first magnet connected to said sensor means for joint reciprocating movement between said first and second positions;

e. a second magnet or ferromagnetic member vertically spaced from said first magnet mounted for sliding reciprocation within said magnet retaining means between a first position in magnetic coupled relation to said first magnet and a second position in magnetic uncoupled relation to said first magnet;

f. a non-magnetic barrier mounted on said housing separating said first and second magnets;

g. spring biasing means biasing said second magnet to said second uncoupled position;

h. valving means connected to said second magnet responsive to said first and second preselected elevations;

i. said downwardly biasing means and said buoyancy of said sensor means being selected so that said first and second magnets remain in uncoupled relation during said first mode of said force means and in coupled relation during said second mode of said force means;

j. said valving means includes a valve housing having a first air passage therethrough with an air pressure inlet port and a second air passage having an air pressure outlet port, and a valve chamber connected to said first and second air passages;

k. a first valve seat formed in said first air passage and said valve chamber;

l. an exhaust passage formed in said housing communicating with said valve chamber and having an exhaust port;

m. a second valve seat formed in said exhaust passage and said valve chamber;

n. a valve mounted for reciprocation in said housing between a first position and a second position and connected to said second magnet by a rod member and having a first valve member dimensioned for seating on said first valve seat when said valve is in said second portion thereby providing communication between said outlet port and exhaust port and a second valve member dimensioned for seating on said second valve seat when said valve is in said first position thereby providing communication between said air pressure inlet port and said outlet port;

o. said sensor means consists of a liquid float member having a bottom and vertical sidewalls mounted for vertical reciprocation;

p. an air- and liquid-impervious container for receiving said float member therein and formed with a liquid material port and a high air pressure port formed in an upper portion of said container;

q. high air pressure means;

r. a first air pressure line connected to said air pressure inlet port of said valve housing and said air pressure means;

s. a pressure regulator in said first air pressure line for reducing the pressure of said high air pressure means;

t. a normally closed two way air valve having a low pressure air operator;

u. a second high pressure air line connected to said high air pressure means and to said two way air valve;

v. a third high air pressure line connected downstream of said two way air valve and connected to said high air pressure port of said container;

w. a check valve in said third high air pressure line permitting air pressure flow into said container only;

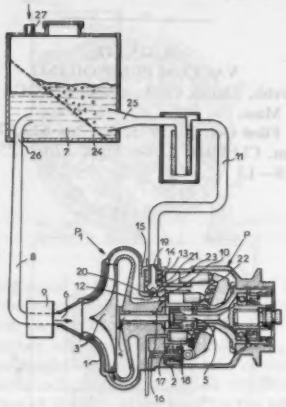
x. second low pressure air line connected to said valve housing outlet port and to said low pressure air operator of said two way valve; and

y. a quick-exhaust valve having a low-pressure air-actuated diaphragm element, a low-pressure port, a high-pressure port operatively connected to the upper portion of said container and an exhaust port.

## 4,025,238
## APPARATUS FOR ELIMINATING THE EFFECTS OF CAVITATION IN A MAIN PUMP

Jean Masclet, Paris, France, assignor to Messier Hispano, Montrough, France

Filed Apr. 17, 1975, Ser. No. 569,087
Claims priority, application France, Apr. 24, 1974, 74.14208
Int. Cl.² F04B *23/04*; B67D *5/62*
U.S. Cl. 417—203 4 Claims

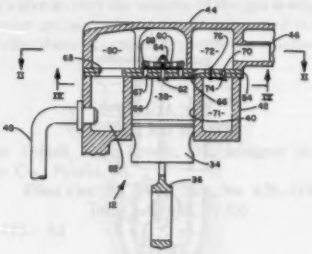


1. Pumping apparatus comprising a main pump having a rotor, a supercharging pump having a rotor, the rotors of the main pump and supercharging pump being coupled in driving relation such that the rotor of the main pump drives the rotor of the supercharging pump, a reservoir for hydraulic fluid external of said main and supercharging pump, said supercharging pump having an inlet connected to said reservoir for receivng hydraulic fluid therefrom and a delivery outlet connected to the inlet of the main pump, said supercharging pump having a further outlet, a duct connecting said further outlet to said reservoir thereby establishing a closed loop for circulation of fluid between the outlet and the inlet of the supercharging pump, a valve means controlling communication between said duct and said further outlet, resilient means acting on said valve means to close the communication between said further outlet and said duct, said resilient means acting on said valve means with a predetermined force which is overcome when the pressure at the inlet of the main pump reaches a predetermined level whereby to avoid the appearance of cavitation in said main pump, a housing rigid with said supercharging pump, said valve means comprising a valve slidably mounted in said housing, said valve comprising a tubular body connected to said duct and a flared-out head on said tubular body normally applied by the said resilient means against a first aperture in the housing constituting the further outlet from said supercharging pump thereby closing said outlet, said aperture connecting the delivery outlet of the supercharging pump with the interior of the housing, said head of the valve having transverse holes located downstream of said first aperture, said housing having a first orifice for the uninterrupted flow of leakage fluid from the main pump to the housing and thence through the transverse holes in said head of the valve, and a second orifice receiving said duct and through which the flow of leakage flow and the fraction of flow delivered by the supercharging pump via said further outlet when the valve is opened are recycled towards the reservoir via the transverse holes and the tubular body of the valve.

## 4,025,239
## RECIPROCATING COMPRESSORS

Hubert Richardson, Jr., Kirkville, and Thomas W. Carter, Baldwinsville, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Dec. 30, 1975, Ser. No. 645,163
Int. Cl.² F04B *49/00*
U.S. Cl. 417—292 7 Claims



1. In a reciprocating compressor operable to provide a relatively high pressure fluid and having a first portion operating at suction pressure and a second portion operating at discharge pressure, the improvement comprising:

conduit means to communicate the first portion operating at compressor suction pressure with the second portion operating at compressor discharge pressure; and

a bimetallic valve directly responsive to the temperature of said fluid to control the flow of fluid through said conduit means, said valve being in a normally open position when the temperature of the fluid is at a relatively low temperature level to permit the flow of fluid from said second portion of said compressor to said first portion thereof, said valve moving to a closed position to terminate flow of fluid through said conduit means as the temperature of the fluid increases due to continued operation of said compressor.

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## 4,025,240
## GEOTHERMAL ENERGY CONTROL SYSTEM AND METHOD

Hugh B. Matthews, Acton, Mass., assignor to Sperry Rand Corporation, New York, N.Y.

Division of Ser. No. 487,405, July 10, 1974, Pat. No. 3,938,334. This application Nov. 10, 1975, Ser. No. 630,245
Int. Cl.² F04B *17/00*, *47/08*
U.S. Cl. 417—365 2 Claims

1. Apparatus for transferring thermal energy from an interior hot stratum of the earth for utilization adjacent the surface of said earth comprising:

means for conveying a first fluid initially in a relatively cool state from a first station adjacent said surface of said earth to a second station adjacent said interior hot stratum,

heat exchanger means adjacent said second station for converting a first portion of said first fluid into a working fluid for driving motor means adjacent said second station,

pump means adjacent said second station responsive to said motor means for pumping a second fluid from said hot stratum to said first station at a pressure retaining said second fluid solely in liquid state,

said pump means having pump rotor means,

said motor means having motor rotor means,

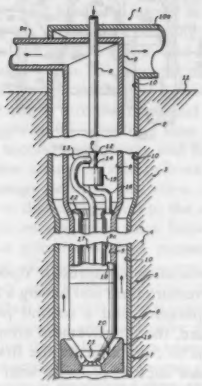
shaft means for rotationally supporting said pump rotor means and said motor rotor means,

radial bearing means for constraining said shaft means for rotation about a predetermined substantially vertical axis,

normally operating thrust bearing means for supporting said shaft means, said pump rotor means, and said motor rotor

means in a normal substantially vertical position when operating above a predetermined rotational speed, said pump means creating when operating a downward thrust on said shaft means,

means adjacent said second station for conveying a second portion of said first fluid at a pressure greater than said second fluid to said radial bearing means and to said



normally operating thrust bearing means for lubrication purposes,

transiently operable thrust bearing means for supporting said shaft means, said pump rotor means, and said motor rotor means in a second axial position only below said predetermined rotational speed in the substantial absence of said pump means downward thrust.

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**4,025,241**

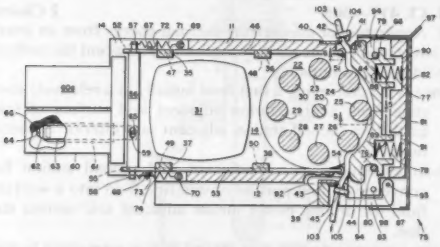
**PERISTALTIC PUMP WITH TUBE PINCHING MEMBERS CAPABLE OF BIASING THE TUBING AWAY FROM THE PUMP ROLLERS**

**Anton Hubert Clemens, Elkhart, Ind., assignor to Miles Laboratories, Inc., Elkhart, Ind.**

**Filed Dec. 22, 1975, Ser. No. 643,015**

**Int. Cl.² F04B** *43/08, 43/12, 45/06*

**U.S. Cl. 417—477** **19 Claims**



**1.** In a peristaltic pump comprising a base member, means for biasing said base member toward a pumping position, a plurality of spaced pump rollers mounted for movement along a predetermined path, and pumping tubing compressed between said base member and said pump rollers when said base member is in its pumping position such that movement of said pump rollers along said predetermined path effects peristaltic pumping of any fluid within said pump tubing, movement of said base member to a non-pumping position being effective to release said compression of said pump tubing such that continued movement of said pump rollers along said path is ineffective to produce said peristaltic pumping action, the improvement which comprises at least one actuating member cooperable with said pump tubing and base member and mounted for movement from a retracted position wherein it is substantially out of compressive contact with said pump tubing against the bias of said biasing means toward an actuating position in which said pump tubing is compressed between said actuating and base members such that fluid flow through said tubing is prevented and said base member is held thereby in a non-pumping position.

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**4,025,242**

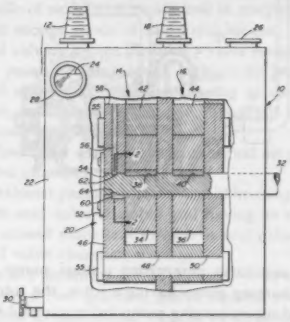
**VACUUM PUMP OILING**

**David B. Webb, Alamo, Calif., assignor to GCA Corporation, Bedford, Mass.**

**Filed Oct. 20, 1975, Ser. No. 623,979**

**Int. Cl.² F01C** *21/04;* **F04C** *27/02, 25/02*

**U.S. Cl. 418—13** **8 Claims**



**1.** In a mechanical vacuum pump comprising a hollow stator, a rotor secured to a shaft for rotation therewith within said stator, an enclosure for said rotor and stator comprising a plurality of plates each disposed transverse to said shaft, a first of said plates having an opening for receiving said shaft, and means for delivering lubricant to the surface of said shaft within said enclosure, the improvement wherein said means comprise

a lubricant conduit in said first plate having an inlet in an exterior surface of said first plate at a location spaced apart from said shaft and an outlet at said opening,

a first recess in the surface of said opening extending from a first location within said opening but spaced apart from said lubricant conduit circumferentially around said opening's surface to a second location at the inner end of said opening, and

a second recess of predetermined volume in the surface of said shaft, said second recess being axially aligned with both said lubricant conduit and a portion of said first recess and having a circumferential extend less than the circumferential spacing of said lubricant conduit and said first recess, thereby enabling lubricant doses of predetermined volume to be transferred from said lubricant conduit to said first recess.

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**4,025,243**

**ORBITAL DEVICE**

**William T. Stephens, New Brighton, Minn., assignor to Gresen Manufacturing Company, Minneapolis, Minn.**

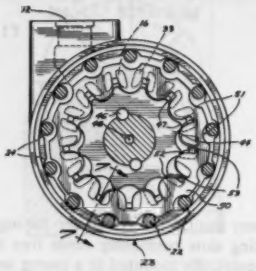
**Filed Jan. 5, 1973, Ser. No. 321,237**

**Int. Cl.² F03C** *3/00;* **F04C** *1/02*

**U.S. Cl. 418—61 B** **8 Claims**

**1.** In apparatus of the class above described including a chambered housing, an externally toothed rotor mounted on a

shaft for rotation within the chamber, an internally toothed orbital member in the chamber and adapted to move in an orbital fashion about said rotor to form expanding and contracting pockets as said rotor rotates and said orbital member orbits, said orbital member having a greater number of teeth than said rotor, the combination comprising; a plurality of circumferentially spaced apart inlet and outlet ports disposed in the housing radially outwardly of the rotor, the number of



inlet ports being equal to the number of teeth on said orbital member and the number of outlet ports being equal to the number of teeth on said orbital member, said ports abutting the orbital member, said ports being radially elongated equal to the effective height of the teeth on said orbital member, each of said ports including a side portion complementary to the configuration of the side of the teeth on the orbital member, and duct means connecting alternate ports to an inlet duct and the others of said ports to an outlet duct.

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**4,025,244**

## ROTARY COMPRESSOR OF LIQUID-COOLED TYPE PROVIDED WITH MEANS FOR ADJUSTING AMOUNT OF LIQUID AND VOLUME OF GAS

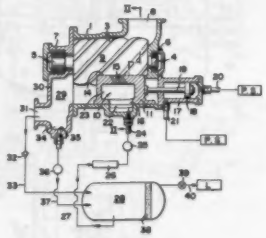
**Goro Sato, Atami, Japan, assignor to Hokuetsu Kogyo Co., Ltd., Japan**

**Filed Sept. 4, 1975, Ser. No. 610,273**

**Claims priority, application Japan, Dec. 24, 1974, 49-147673**

**Int. Cl.² F04C** *29/02*

**U.S. Cl. 418—87** **4 Claims**



1. A rotary compressor of the liquid-cooled type comprising a casing, male and female rotors contained in said casing, means for feeding a cooling, lubricating and sealing liquid into gas compression chambers defined by said casing and rotors, said casing having a discharge chamber connected to said gas compression chambers, a tank for a compressed gas and a cooling, lubricating and sealing liquid which is connected to said discharge chamber and said liquid feed means, an adjusting valve for adjusting the intake volume of a gas to be compressed by shifting the sucking and shutting position in said compression chambers, said valve having a hollow main body and being capable of sliding in the axial direction of said rotors, and means for sliding said adjusting valve in said axial direction being provided in said casing, a first slot connected to said liquid feed means formed in said casing on a sliding surface for said main body of the adjusting valve, a second slot connected to said first slot formed in said main body of the adjusting valve, and openings for injecting the liquid fed through a liquid passage defined by the overlap of said two slots into said compression chambers formed in said main body of said adjusting valve, the cross-sectional area of said overlapped liquid passage being changed by the sliding of said adjusting valve so that the volume of the gas is adjusteed while the optimum amount of said liquid is injected into said compression chambers in conformity with the volume of said gas.

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**4,025,245**

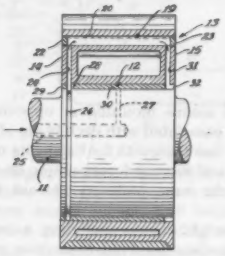
## COOLED ROTOR

**Alexander Goloff, East Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Oct. 28, 1975, Ser. No. 626,419**

**Int. Cl.² F01C** *21/06*

**U.S. Cl. 418—94** **3 Claims**



1. In a rotary engine structure having a center shaft defining an axis of rotation, an annular bearing coaxially journalling said shaft and having opposite ends and an axial mid-portion, a rotor coaxially carried by said bearing having opposite end walls and a plurality of outer arciform side walls intersecting at a plurality of apices provided with seals, improved means for cooling said rotor comprising: means in each apex defining an axial cooling fluid passage extending between said end walls; means at one of said end walls defining a first fluid duct opening inwardly to one end of said bearing and outwardly to said cooling passage; means at the other of said end walls defining a second fluid duct opening inwardly to the other end of said bearing from said cooling passage; and lubricant supply means for conducting fluid through said shaft in a first path directly to said first fluid duct and in a second path directly to said mid-portion of the bearing for lubricating the bearing by flow axially outwardly in both opposite directions from said mid-portion, the flow in one direction being to said first fluid duct for flow with the lubricant delivered thereto from said first path seriatim through said first fluid duct, said cooling passage, and said second fluid duct to cool said apices.

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**4,025,246**

## ROTARY MACHINE WITH COUNTERWEIGHTS FOR INTERFITTED VANES

**Michel Normandin, 1328 Nelles Ave., Ste-Foy, Quebec, Canada**

**Continuation-in-part of Ser. No. 496,809, Aug. 12, 1974, Pat. No. 3,964,447, and a continuation-in-part of Ser. No. 498,215, Aug. 16, 1974, Pat. No. 3,954,358. This application June 20, 1975, Ser. No. 588,890**

**Int. Cl.² F01C** *1/00;* **F16D** *57/00, 31/06;* **F01C** *21/00*

**U.S. Cl. 418—151** **21 Claims**

1. A rotary machine comprising, in combination,

a stationary housing having an interior profile defining a monolobic configuration,

a rotary cylindrical body having an axis of rotation arranged eccentrically in said housing, said body including a series

of arc-shaped segments mounted in circular alignment in said housing and being equally shaped from one another to define therebetween a series of diametrically opposite slots,

a symmetrical system of vanes received in said slots, and bearing at each extremity against said interior profile, said vanes being longer than the diameter of said body and being shiftable in said slots during rotation of said body, each of said vanes including a pair of blades disposed at 180° with respect to each other and interconnected with ties, said ties being shaped to interfit each other to thereby prevent interfering with each other when said vanes slide in said slots,

counterweight means mounted at opposite ends of said rotary body associated with each blade of each individual vane and in line therewith for balancing the effects of the centrifugal and inertial forces acting on said vanes, and minimzing the vane pressure on said housing interior profile,

said counterweight means including a series of radially displaceable discs received in cavities provided in said cylindrical body, and stepped faces in said cavities for selectively limiting the radial displacement of each said disc in said cavities.

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**4,025,247**

## CORNER SEAL

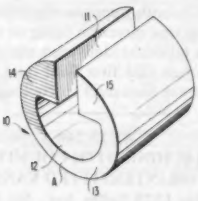
**Noriyuki Kurio, Fuchu, and Tadashi Ebihara, Hatogaya, both of Japan, assignors to Toyo Kogyo Co., Ltd., Fuchu and Nippon Piston Ring Co., Ltd., Tokyo, both of, Japan**

**Filed Feb. 19, 1976, Ser. No. 659,196**

**Claims priority, application Japan, Feb. 19, 1975, 50-21879[y]**

**Int. Cl.² F04C *27/00***

**U.S. Cl. 418—120** **2 Claims**



1. A corner seal member for a rotary internal combustion engine, said member being of a generally hollow cylindrical shape having an outer diameter suitable for fitting in a corner seal groove of a rotor of said rotary internal combustion engine, the wall of said member being relatively thin over a semicircular portion thereof to define a half moon opening in said member wherein a gas pressure in said half moon opening will press the outer walls of said cylinder against said corner seal groove, the remaining portion of said wall being relatively thick compared to said thin portion and defining an elongated axial groove for fitting an axial seal therein.

**4,025,248**

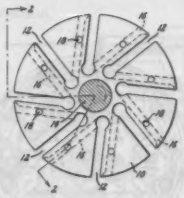
## RADIALLY EXTENDED VAPOR INLET FOR A ROTARY MULTIVANED EXPANDER

**William D. C. Richards, King of Prussia; James L. Lilly, Stratford, and Lawrence E. Gray, Audubon, all of Pa., assignors to General Electric Company, Fairfield, Conn.**

**Filed June 16, 1975, Ser. No. 587,427**

**Int. Cl.² F01C *21/12***

**U.S. Cl. 418—184** **4 Claims**



1. In a rotary multivaned expander having a rotor with axially extending slots containing vanes free to reciprocate, said rotor eccentrically mounted in a casing and confined by endwalls, the improvement comprising:

vapor distribution ports exending between the base of each slot and the surface of said rotor forward of said slot; and

passages for admitting vapor axially inwardly from the ends of said rotor to said vapor distribution ports at a location between the ends of said vapor distributionn ports.

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**4,025,249**

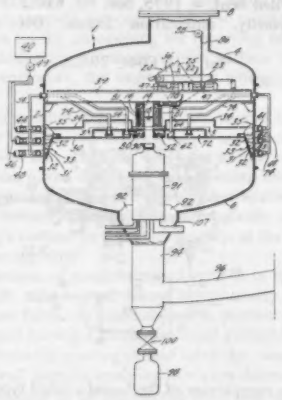
## APPARATUS FOR MAKING METAL POWDER

**Jerry A. King, Palm Beach Gardens, Fla., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Jan. 30, 1976, Ser. No. 653,693**

**Int. Cl.² B22D *23/08*; B29C *23/00***

**U.S. Cl. 425—6** **4 Claims**



1. An apparatus for producing metal powder from molten metal comprising a housing, container means in said housing for containing molten metal, means having an opening therein for receiving molten metal flow from said container means, means for tilting said container means for pouring molten metal therefrom into said opening, pivotal mounting means for pivotally mounting said container means, said pivotal mounting means being positioned on a movable carriage, means for controlling the movement of said carriage as the container means is pivoted by said tilting means to maintain a

desired flow stream from said container means into the opening.

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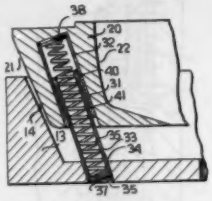
**4,025,250**
**SEGMENTED MATRIX WITH GUIDE MEANS AND RETAINING PINS**

**Kenneth T. MacMillan, Macon, Ga., assignor to MacMillan Mold Co., Inc., Macon, Ga.**

**Filed Nov. 25, 1975, Ser. No. 635,061**
**Int. Cl.² B29H** *5/04*
**U.S. Cl. 425—17** **22 Claims**




1. A mold assembly comprising a base, a matrix movable relative to said base, means carried by said base for normally urging said matrix away from said base, means between said base and matrix for guiding relative movement therebetween, means coupled between said base and matrix for maintaining the latter in assembled relationship in opposition to motion between said base and matrix created by said urging means urging said matrix away from said base, and means connected only to said base for retaining said urging means and guiding means upon said base upon the uncoupling of said coupling means and the disassembly of said matrix from said base.

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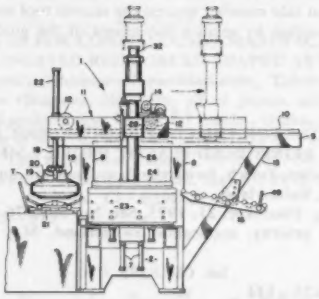
**4,025,251**
**VULCANIZER LOCK MEANS**

**Armindo Cantarutti, Akron, Ohio, assignor to NRM Corporation, Akron, Ohio**

**Filed Nov. 6, 1975, Ser. No. 629,504**
**Int. Cl.² B29H** *5/08*
**U.S. Cl. 425—31** **28 Claims**

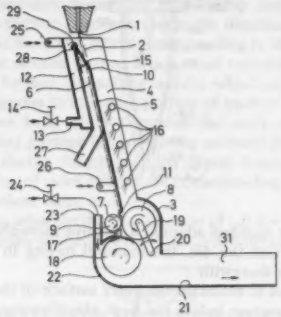


1. In a tire curing press comprising an annular fixed mold support plate, an annular vertically movable mold support plate movable to open and close the press, an axially elongated cylindrical rotatable ring journalled with respect to said fixed mold support plate and surrounding both said fixed and movable mold support plates when said press is closed, said ring including an inturned flange at one end interfitting with a flange on said fixed mold support plate, and a breech lock at the other end of said ring interfitting with said movable mold support plate to lock said press closed during cure when said movable mold support plate is closed and said ring is rotated.

**4,025,252**
**GRANULATING APPARATUS, ESPECIALLY FOR STRANDS OF THERMOPLASTIC MATERIALS**

**Friedrich Hunke, Grossostheim, Germany, assignor to Automatik Apparate-Maschinebau H. Hench GmbH, Grossostheim, Germany**

**Filed Jan. 22, 1976, Ser. No. 651,338**
**Claims priority, application Germany, Jan. 28, 1975, 2503455**
**Int. Cl.² D06H** *7/00*
**U.S. Cl. 425—67** **26 Claims**




1. In a granulating apparatus, especially for strands of thermoplastic materials, wherein the strands are extruded in a molten state from nozzle means, and including transport means in which the strands are cooled by water and transported to a cutting means, said transport means defining a feed advance direction, the improvement comprising a pair of strand feeding rollers defining a gap therebetween and being located between said cutting means and said transport means for exerting a pull on said strands, said nozzle means and the gap between said feeding rollers defining a common plane, said transport means comprising chute means having an inlet end adjacent to said nozzle means and an outlet end adjacent to said gap between said strand feeding rollers, the inlet and outlet ends of said chute means projecting from said common plane in a direction to deflect the strands from said common plane whereby the strands are urged against the inlet end as well as against the outlet end of the chute means by the pulling force of said feeding rollers.

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**4,025,253**
**METHOD AND APPARATUS FOR THE PREPARATION OF PLASTIC ARTICLES BY EXTRUSION**

**Carl B. Havens, Fresno, Calif., assignor to The Dow Chemical Company, Midland, Mich.**

**Division of Ser. No. 474,505, May 30, 1974, Pat. No. 3,976,733, and a continuation-in-part of Ser. No. 293,825, Oct. 2, 1972, abandoned. This application Jan. 15, 1976, Ser. No. 649,308**
**Int. Cl.² B29D** *23/04*
**U.S. Cl. 425—72 R** **7 Claims**

1. An extrusion apparatus, the apparatus being particularly suited and adapted for the preparation of synthetic resinous thermoplastic extrudable tubing, the apparatus comprising in cooperative combination

a source of heat plastified synthetic resinous extrudable film forming material,

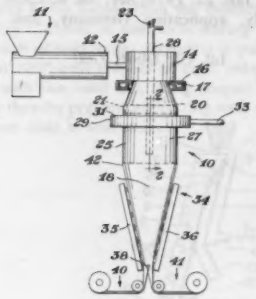
an extrusion die, the die having

an annular extrusion orifice, the orifice being in operative communication with said source,

a generally annular gas bearing in spaced relationship to the orifice and being generally coaxially disposed therewith, the bearing having an outside diameter greater than the orifice,

a mandrel disposed adjacent to the bearing and remote from the orifice, the mandrel having

an outer surface having the general cross-sectional configuration of the cross-sectional configuration of the bearing in a plane generally normal to an axis passing generally centrally through the die, bearing and mandrel, the bearing and the mandrel adapted to receive thereabout a tube extruded from the die, the mandrel having in operative association therewith



cooling means to maintain the outer surface of the mandrel at a temperature below the heat plastification temperature of a heat plastifiable extrudable film forming material.

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**4,025,254**

**APPARATUS FOR THE PRODUCTION OF A FLEECE**

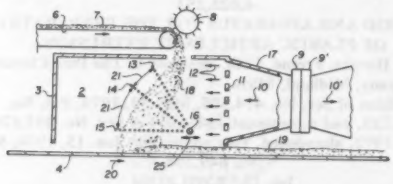
**Dieter Arnold, Darmstadt, Germany, assignor to Carl Schenck AG, Darmstadt, Germany**

**Filed June 23, 1975, Ser. No. 589,381**

**Claims priority, application Germany, Oct. 25, 1974, 2450685**

**Int. Cl.² B29J 5/00**

**U.S. Cl. 425—81** **10 Claims**



1. In an apparatus for producing a fleece, wherein a spreading station arranged above a conveyor belt receives fleece forming material from a charging station to deposit said material on said conveyor belt and wherein said spreading station comprises material flow disturbing means, the improvement wherein said material flow disturbing means comprise a plurality of screens intersecting at a common axis spaced above and across said conveyor belt, said common axis extending normal to the direction of movement of said conveyor belt, said apparatus further comprising means for directing material received in said spreading station onto said screens so that the material may pass through said screens onto said conveyor belt.

**4,025,255**

**APPARATUS FOR MAKING LIDS OR CONTAINERS**

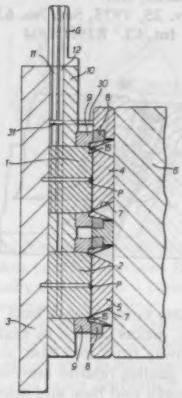
**Brian Leo Chudleigh Sutch, Thames Ditton, England, assignor to Airfix Industries Limited, Surrey, England**

**Filed June 2, 1976, Ser. No. 691,985**

**Claims priority, application United Kingdom, June 10, 1975, 24894/75**

**Int. Cl.² B29F 1/10**

**U.S. Cl. 425—114** **7 Claims**



1. A machine for making composite articles, the machine including a first tool and a second tool relatively movable between an open condition and a closed condition in which they define a mould cavity for receiving a blank and for injected material to be moulded in contact with the blank, and a pair of guides movable relative to the first tool and situate, when the tools are in the open condition, to feed a blank to a position extending across and in the path of relative movement of the tools to the closed condition, the guides comprising two channel section members, the bases of which are spaced to allow a blank to travel under gravity therebetween while received between parallel side members of each guide, each guide at the region of the path of relative movement of the first tool and movable guides comprising at least one movable member, movable between a guide position in extension of that side member nearest the second tool and an inoperative position by relative movement of the guide and the first tool.

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**4,025,256**

**APPARATUS FOR THE CONTINUOUS FABRICATION OF FIBER REINFORCED PLASTIC PROFILE MEMBERS**

**Rudolf Heller, Zurich, Switzerland, assignor to Contraves AG, Zurich, Switzerland**

**Filed Apr. 21, 1975, Ser. No. 569,776**

**Claims priority, application Switzerland, May 24, 1974, 7102/74**

**Int. Cl.² B29F 3/10**

**U.S. Cl. 425—114** **8 Claims**

1. An apparatus for the continuous fabrication of fiber reinforced plastic profile members, comprising a continuous impregnation device for impregnating fibrous mats with a liquid hardenable plastic reaction mixture, said fibrous mats moving in a predetermined direction of travel, a transport and forming device arranged after said continuous impregnation device with respect to the direction of travel of the fibrous mats for drawing-through, forming and hardening the impregnated fibrous mats, said continuous impregnation device comprising two superimposed and spaced contact and guide plates, said two contact and guide plates successively forming a continuously tapering inlet zone and an outlet zone, and at both sides of the contact and guide plates two edge guide

zones for receiving the marginal edges of the through-passing fibrous mats, said two edge guide zones formed by confronting surfaces of said spaced contacting and guide plates freely communicating with the ambient atmosphere, the spacing between the confronting surfaces forming said two edge guide zones being effective for compressing the marginal edges of the throughpassing fibrous mats for restricting the lateral outflow of impregnated plastic through the marginal edges of the through-passing fibrous mats into the atmosphere while at the same time permitting air entrained in the fibrous mats to escape to the atmosphere through the marginal edges of the

fibrous mats, one of said contact and guide plates being provided with an impregnation recess at a location between the inlet zone, the outlet zone and the lateral edges guide zones, said impregnation recess being positionally oriented transversely with respect to the direction of travel of the fibrous mats, said impregnation recess in the lower contact and guide plate descending via a sharp edged, linear step from the inlet zone and spaced thereafter asymptomatically merging with the outlet zone, and infeed conduit means flow communicating with said impregnation recess for the infeed of the liquid plastic reaction mixture which is under pressure.

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**4,025,257**

**APPARATUS FOR CONTINUOUSLY MANUFACTURING AN ELONGATED REINFORCED SHAPED ARTICLE**

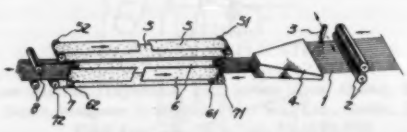
**Norio Sagane, Mishima; Toru Morimoto, Takatsuki, and Fumihiko Okagawa, Hirakata, all of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Division of Ser. No. 361,045, May 17, 1973, Pat. No. 3,917,774. This application June 12, 1975, Ser. No. 586,370**

**Claims priority, application Japan, May 17, 1972, 47-49279**

**Int. Cl.² B29D** *27/04*

**U.S. Cl. 425—115** **12 Claims**



1. An apparatus for continuously manufacturing an elongated shaped article of a foamed resin reinforced by a multiplicity of continuous and parallel fibers, said apparatus comprising:

a. means for arranging a multiplicity of advancing continuous and parallel fibers into a sheet-like bundle of fibers;

b. means adjacent and downstream of (a) for impregnating the sheet-like bundle of fibers with a liquid foamable resin;

c. means adjacent and downstream of (b) for gathering the resultant resin impregnated sheet-like bundle of fibers into a gathered bundle of continuous fibers having said resin dispersed therein;

d. a movable passage adjacent and downstream of (c) for receiving the gathered bundle of fibers from (c), the walls of which contact and move with the gathered bundle of fibers to form and shape said gathered bundle of fibers into the elongated shaped article, said movable molding passage (i) comprising three or more endless belts facing one another in parallel relationship and (ii) having a cross-section perpendicular to the direction of movement of said bundle of fibers corresponding to the cross-section of the desired shaped article; said movable molding passage further comprising a tube which surrounds and is contiguous to at least a portion of each of the runs of the endless belts which comprise the walls of the movable molding passage for preventing outward deflection of the runs during foaming of the liquid foamable resin, the number of sides of the tube corresponding to the number of endless belts; and

e. means adjacent the downstream of (d) for extracting said elongated shaped article from said molding passage.

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**4,025,258**

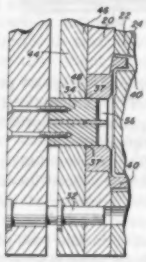
**APPARATUS FOR FORMING SUPPORT DEVICE**

**Meyer J. Ragir, Highland Park, and George R. Olen, Chicago, both of Ill., assignors to Meyer J. Ragir, Highland Park, Ill.**

**Continuation of Ser. No. 443,993, Feb. 20, 1974, abandoned, which is a division of Ser. No. 93,526, Oct. 30, 1970, abandoned. This application Sept. 10, 1975, Ser. No. 612,194**

**Int. Cl.² B29C** *6/04*; **B29F** *1/10*

**U.S. Cl. 425—123** **2 Claims**



1. Apparatus for making a molded article having a wooden backing member bonded thereto comprising an injection molding machine having a molding die assembly including a male die portion and a female die portion, a punch and die mechanism supported on one of said molding die portions, means moving said male and female die portions into registry with one another to form a mold-defining cavity therebetween, said punch and die mechanism including cooperative punch means and cutting edge means in alignment with said mold-defining cavity, a supply of wooden backing material, means supporting and aligning said wooden backing material between said punch means and said cutting edge including slot means extending through said one molding die portion, said slot means being wider than the thickness of said wooden backing material, and means normally biasing said wooden backing material away from said cutting edge and towards said punch means. said die moving means including means advancing said punch means towards said closed cavity to sever a portion from said backing material to form a backing member and to advance said backing member towards and support said backing member along only a portion of the periphery of one wall of said mold-defining cavity, and means to feed molten material into said mold defining cavity to fill said cavity,

whereby said molded article is formed and said wooden backing member is adhered thereto.

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**4,025,259**

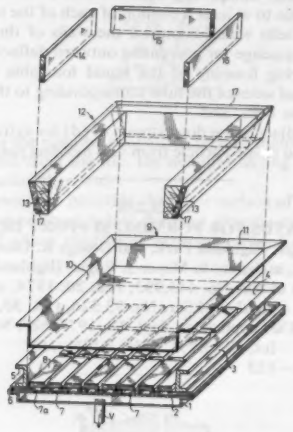
## APPARATUS FOR THE PRODUCTION OF PREFABRICATED BUILDING COMPONENTS SUCH AS WALL ELEMENTS, ROOM CELLS OR THE LIKE CLAD WITH CERAMIC PLATES

**Harald Howe, Donauweg 11, Junkersdorf, Germany (D-5022), and Klaus Goldner, Waldstrasse 31, Traunricht, Germany (D-8472)**

**Division of Ser. No. 516,614, Oct. 21, 1974, abandoned. This application Mar. 15, 1976, Ser. No. 666,762**

**Int. Cl.² B28B** *23/22*

**U.S. Cl. 425—123** **7 Claims**



1. Apparatus for the production of prefabricated building components formed of a cementitious material clad with ceramic plates, said apparatus comprising:

a form having a peripheral wall;

a base plate in said form surrounded by said wall and having a plurality of holes at spaced locations, said base plate being connected to a source of vacuum for applying a vacuum to said holes;

an elastic mat mounted on said base plate within said form, said mat having holes aligned with the holes of said base plate and being suitable for receiving the ceramic plates over said holes for subjecting them to the vacuum; and

a trough-shaped impervious sheet having a bottom portion positionable over said mat on the exposed surface of the plates and a peripheral wall portion sealable to said peripheral wall of said form in an air-tight manner, said sheet being formed of highly flexible material for embracing the exposed surface of each of said plates and reducing the volume of spaces between the plates responsive to the application of a vacuum to said holes.

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**4,025,260**

## FOOD EXTRUSION DEVICE

**William E. Neel, Archbold, Ohio, assignor to Beatrice Foods Co., Chicago, Ill.**

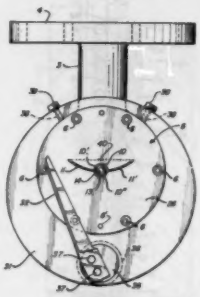
**Filed June 3, 1974, Ser. No. 475,578**

**Int. Cl.² B30B** *11/22, 15/02*

**U.S. Cl. 425—131.1** **3 Claims**

1. In an extrusion device for the production of a food product comprising a covering of a first food material and a filling of a second food material, said device including a double nozzle having an inner nozzle portion of cylindrical shape and an outer nozzle portion and means for extruding said first and second food materials through said outer and inner nozzle portions, respectively,

the improvement that said outer nozzle portion is shaped to form a central opening having two substantially semicylindrical sections and enveloping said inner nozzle portion on two sides thereof, symmetrically throughout the axial extent of said nozzle, and also form two slots curved in the same direction and outwardly extending from said central opening on the other two sides, respectively, said substantially semicylindrical sections communicating therebetween with said outwardly extending curved slots and the thickness of said outwardly extending slots being



approximately the same as the radial width of said substantially cylindrical sections

so that the ensuing differential in the frictional forces acting on said first food material in said central opening and in said slots, respectively, gives rise to a curling action of the extruded first food material, and consequently also of said filling of said second food material, about an axis generally perpendicular of the axis of said nozzle, and

that said curled first food material as extruded through the two sides of said central opening envelops said curled filling of the second food material on the outside and inside thereof, respectively.

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**4,025,261**

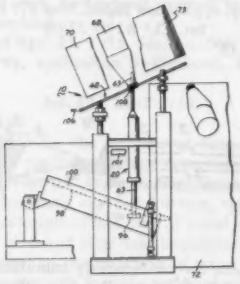
## UNDERBLOWN PARTS REMOVAL FROM CONTINUOUS BLOW MOLDING MACHINERY

**Robert Rutkowski, Northampton, Mass., and Andrew M. Taylor, Bristol, Conn., assignors to Monsanto Company, St. Louis, Mo.**

**Filed Apr. 2, 1975, Ser. No. 564,221**

**Int. Cl.² B29C** *17/02*

**U.S. Cl. 425—139** **10 Claims**



1. In blow molding apparatus comprising a plurality of rod assemblies continuously traversing a closed path between preform loading means, preform molding means and blown article discharge means;

the combination therewith of:

means operatively cooperating with said discharge means for selectively permitting removal of blown articles and preventing removal of underblown parts from said rod assemblies by said discharge means; and

stripping means between the molding means and loading means downstream of said discharge means for automatically removing underblown parts from said rod assemblies which pass through said discharge means.

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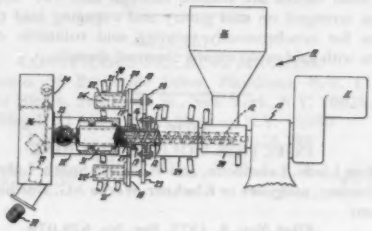
## 4,025,262
## VARIABLE LENGTH EXTRUSION DIE

**Anthony H. Furman, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Nov. 18, 1974, Ser. No. 524,576**
**Int. Cl.² B29F *3/06***
**U.S. Cl. 425—145** **9 Claims**



1. In an apparatus for the extrusion of a cohesive, continuous, rod-like coal-containing body wherein an extruder screw is disposed within extruder barrel construction, which in turn is connected to feed and discharge structures spaced from each other, said feed structure being means for feeding a mixture containing powdered coal and a binder into said barrel construction and said discharge structure being die means for receiving and shaping the mixture forcibly discharged from said barrel construction, means being provided adjacent said barrel construction for heating at least a portion thereof, means positioned downstream of said die means for severing the emerging rod-like body into smaller portions and means operatively associated with said screw for driving said screw, the improvement comprising:

a. said die means being of substantially constant cylindrical configuration internally with the downstream end thereof remaining open throughout the extrusion operation and

b. means for controllably infinitely varying within a preselected range the extent of internal surface area of said die means available for contact with the consolidating coal-containing mixture, said die means retaining a substantially cylindrical configuration and said varying means being connected to an element in the group of elements consisting of said die means and said extruder screw whereby relative movement between said die means and said extruder screw is provided.

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## 4,025,263
## THERMOPLASTIC DUPLICATION PLATE MANUFACTURING APPARATUS

**Ikuo Morino, Toyonaka, and Nobuo Aisu, Osaka, both of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan**

**Filed June 23, 1976, Ser. No. 699,050**
**Claims priority, application Japan, Sept. 5, 1975, 50-108171**
**Int. Cl.² B29C *3/06, 15/00***
**U.S. Cl. 425—168** **13 Claims**

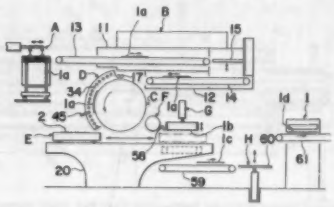
1. An apparatus for manufacturing a thermoplastic duplication plate having a relief image formed at one surface thereof, which comprises:

a hollow cylinder supported in position for rotation in one direction, said hollow cylinder during each complete rotation thereof moving past a receiving station and then a transfer station angularly spaced from said receiving station and situated on the leading side with respect to the direction of rotation of said hollow cylinder;

means for successively supplying thermoplastic resin sheets onto said hollow cylinder one at a time at said receiving station, the thermoplastic resin sheet so supplied onto said hollow cylinder at said receiving station being subsequently transported towards the transfer station while it clings to an outer peripheral surface of said hollow cylinder;

means positioned externally of said hollow cylinder for heating the thermoplastic resin sheet being transported by said hollow cylinder from said receiving station towards said transfer station to a point where said thermoplastic resin sheet become substantially semi-fluidized;

carriage means supported in position for linear movement between stand-by and operated position in a direction transversely of the imaginary plane passing through the longitudinal axis of said hollow cylinder and having a flat



support surface for the support of a matrix thereon, said matrix having a relief pattern in complemental in shape to the relief image to be transcribed to the thermoplastic resin sheet, said carriage means during movement from said stand-by position towards said operated position being synchronized with said hollow cylinder such that the thermoplastic resin sheet being transported by said hollow cylinder is registered at said transfer station with the matrix fixedly mounted on said flat support surface of said carriage means;

said thermoplastic resin sheet during passage thereof through a transcription clearance defined between the outer peripheral surface of said hollow cylinder and said flat support surface of said carriage being then underneath said hollow cylinder, being penetrated into and transferred onto said matrix during the continued movement of said carriage means towards said operation position; and

means for separating the thermoplastic resin sheet, which has been transferred onto said matrix, from said matrix when said carriage means is held in said operated position.

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## 4,025,264
## DIE CLOSING UNIT WITH RETRACTABLE TIE RODS

**Karl Hehl, Arthur-Hehl-Str. 32, 7298 Lossburg, Germany**

**Continuation-in-part of Ser. No. 569,886, April 21, 1975, abandoned. This application Dec. 15, 1975, Ser. No. 640,531**
**Claims priority, application Germany, Dec. 13, 1974, 2459025**
**Int. Cl.² B29F *1/00*; B29C *3/02***
**U.S. Cl. 425—190** **18 Claims**

1. A die closing unit for an injection molding machine designed to produce plastic or metallic articles through the injection of suitable raw material into a multiplate injection molding die having a cavity, which die is to be opened and closed by means of said unit in a reciprocating straight-line axial motion, whereby the injection molding die is readily

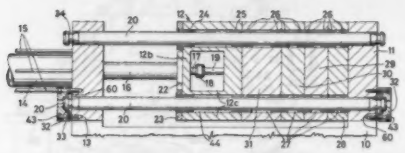
removable and interchangeable with another die, said die closing unit comprising in combination:

a first die carrier member having an axially oriented face for the attachment thereto of a constituent half of said injection molding die;

a second die carrier member spaced a distance from the face of the first member and having an oppositely oriented face for the attachment thereto of the other constituent half of the injection molding die in axial alignment with said first die half;

means for forcibly moving one of the two die carrier members towards and away from the other in a reciprocating die closing and opening motion;

means for axially guiding the movable one of the two die carrier members in relation to the stationary one, said means including at least two tie rods extending parallel to the unit axis, laterally outside and on opposite sides of the space occupied by the cavity of an injection molding die, each tie rod having one extremity rigidly connected to one of the two die carrier members and a central length portion thereof guidingly received in a guide bore of the other die carrier member; and wherein



the rigid connections between the tie rod extremities and said one die carrier member are axially preloaded thread-clamped connections; and

at least one thusly rigid connected tie rod engages a connecting bore in said connected die carrier member with a configuration which permits release of the rigid connection and retraction of the tie rod through its connecting bore;

said retractable tie rod includes, as part of its releasable connection, an end portion which protrudes from the axially outer side of said connected die carrier member;

the protruding tie rod end portion defines an axial force transmitting surface which is facing inwardly towards said connected die carrier member and whose maximum diameter is not greater than the diameter of its connecting bore; and

the retractable tie rod further includes, as part of its releasable connection, an abutment member which is axially engaged between said axial force transmitting surface and said connected die carrier member, and threaded means for axially preloading the tie rod against said connected die carrier member in the abutment sense of said abutment member.

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**4,025,265**

## CONCRETE TIE FORMING SYSTEM

**Peter Auer, Ottobrunn, Germany, assignor to Dyckerhoff & Widmann Aktiengesellschaft, Munich, Germany**

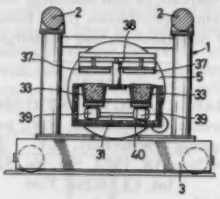
**Filed Oct. 15, 1975, Ser. No. 622,761**

**Claims priority, application Germany, Oct. 15, 1974, 2448919**

**Int. Cl.² B28B** *1/08, 13/05*

**U.S. Cl. 425—211** **12 Claims**

1. Apparatus for producing concrete ties comprising mold means for receiving therein poured concrete to form said ties, a gantry operatively associated with said mold means for transporting said mold means between a filling location and a dismantling location, rotatable clamping means on said gantry for clamping said mold means therein and for holding said mold means while rotating said clamped mold means through an angle of about 180° from an upright position wherein the molds are filled to an inverted position wherein the formed concrete ties are dismantled from said mold means, said rotatable clamping means including a pair of rotatable clamping devices aligned with each other across said gantry with each of said clamping devices including means for holding said mold



means in filled condition with said concrete ties therein while said mold means are rotated through said 180° angle, and means arranged on said gantry and engaging said clamping means for synchronously rotating said rotatable clamping means with said mold means clamped therein.

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**4,025,266**

## INJECTION MOLDING MACHINE

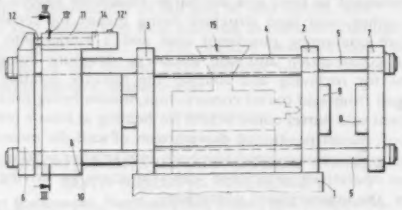
**Joachim Linde, Leiselheim, and Wolfgang Späth, Lahr, both of Germany, assignors to Klockner-Werke AG, Duisburg, Germany**

**Filed Nov. 5, 1975, Ser. No. 629,079**

**Claims priority, application Germany, Nov. 13, 1974, 2453696**

**Int. Cl.² B29F** *1/00*

**U.S. Cl. 425—242 R** **8 Claims**



1. In an injection molding machine, a combination comprising a stationary frame including a stationary mold-mounting plate, a stationary support plate spaced from said stationary mold-mounting plate, and a plurality of axially parallel tubular members connected to and extending between said stationary plates; a movable frame including a plurality of rods each received in one of said tubular members for movement axially thereof and having a first end extending axially beyond said stationary mold-mounting plate and a second end axially beyond said stationary support plate, a movable mold-mounting plate attached to said first ends of said rods, and a movable support plate attached to said second ends of said rods; means for interchangeably mounting one part of a split injection mold on said stationary mold-mounting plate and another part thereof on said movable mold-mounting plate for movement therewith between an open and a closed position of said injection mold; guide means mounted on said rods intermediate said stationary and movable support plates for axial movement of said movable frame relative thereto and connected to said stationary support plate for limited axial displacement relative thereto; means for moving said movable frame relative to said guide means, including at least one cylinder-and-piston unit extending between and connected to said movable support plate and said guide means, respectively; means for clamping said guide means to said rods at any location of the latter to thereby arrest said movable frame in a position corresponding

to said closed position of said injection mold regardless of axial dimensions of the latter; means for injecting moldable material under pressure into said injection mold in said closed position thereof, whereby said other mold part is subjected to a separating force urging the same axially away from said one mold part; and means for counteracting said separating force, including a membrane plate rigidly connected to one of said guide means and said stationary support plate, a pressure plate rigidly connected to the other of said stationary support plate and said guide means in juxtaposition with said membrane plate, a flexible membrane interposed between said pressure plate and said membrane plate and sealingly connected to the latter to define a pressure space therewith, and means for admitting pressurized medium into said pressure space to act on said membrane plate and on said membrane to deflect the latter against said pressure plate and exert a force on said membrane and pressure plate which at least equals said separating force, whereby said injection mold is maintained in said closed position thereof.

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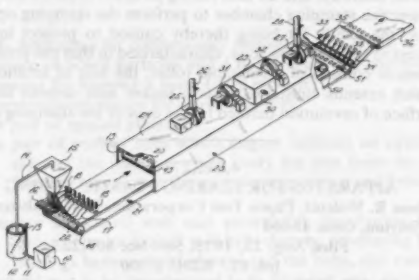
**4,025,267**

## CONTINUOUS MOLDING MACHINE

**John Amato, 36 Brookside Drive, Plandome, N.Y. 11030; Charles Hirsch, 200 E. 84 St., New York, N.Y. 10028, and Louis Siegel, 22 Mine Road, Monroe, N.Y. 10950**

**Filed Nov. 4, 1975, Ser. No. 628,798**
**Int. Cl.² B29C *7/00***
**U.S. Cl. 425—236** **9 Claims**



1. Apparatus for continuous molding comprising first and second endless conveyors, a plurality of two-part split molds, one part of each of said molds being loosely connected to one of the conveyors and the other part of each of said molds being loosely connected to the other conveyor, means for guiding the conveyors so that the mold parts on the respective conveyors converge to close the molds and then diverge to open the molds and means for automatically and progressively correcting misalignment of the mold parts on the respective conveyors as the mold parts converge, the automatic progressive misalignment correcting means including tapered male members fixed to the mold parts on one of the conveyors and female members fixed to the mold parts on the other conveyor, the female members each having a flared recess dimensioned to mate with a respective one of the male members, the male and female members being of such axial dimensions and so oriented that they begin to mate as the mold parts converge, frames, means operatively connecting each of the frames to a respective one of the conveyors to move with the conveyor and permitting each frame to shift relative to the conveyor to which it is connected for alignment with a frame connected to the other conveyor, pins fixed to the frames, apertures passing through the mold parts, the pins being received in the apertures and the apertures being of larger diameter than the pins so that the pins are received in the apertures with a clearance fit which permits lateral displacements of the mold parts, tapered male members fixed to the frames connected to one of the conveyors and female members fixed to the frames connected to the other conveyor, the female members fixed to the frames each having a flared recess dimensioned to mate with the male members fixed to the frames, the male and female members fixed to the frames being of such axial dimensions and so oriented that they begin to mate as the mold parts converge and before the male and female members fixed to the mold parts begin to mate.

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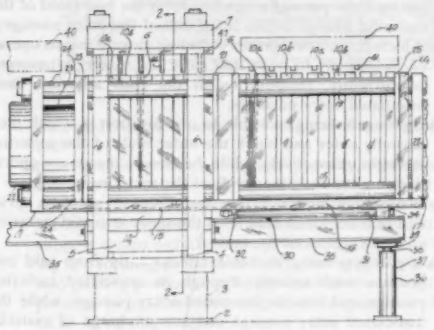
**4,025,268**

## ARTICLES MOLDING APPARATUS

**Don A. Taylor, Box No. 4, Wadsworth, Ohio 44281**

**Division of Ser. No. 343,646, March 22, 1973, abandoned. This application Feb. 24, 1975, Ser. No. 552,043**
**Int. Cl.² B29C *5/00*; B29F *1/00***
**U.S. Cl. 425—246** **13 Claims**



1. A molding apparatus adapted to be disposed between a pair of press platens which are power driven along a predetermined path from a starting position relatively toward each other to a final operating position and which are returnable away from each other along said path to the starting position, and comprising:

mold means including at least one mold having a pair of mold sections with matching parting surfaces, respectively, which extend through one edge of the closed mold and which, when the mold is closed, define a plurality of article forming cavities having lineal entry passages, respectively, each of which is open at its outer end through said one edge of the mold and at its inner end into its associated cavity; said entry passages being in spaced relation to each other endwise of said one edge;

each entry passage being lineal and of uniform size and cross section throughout its length and being disposed at, and open at, the parting surfaces of the mold sections, with one part of the passage peripheral wall, which part is coextensive in length with the passage, being disposed on one mold section, and the remainder of said peripheral wall being on the other mold section;

supporting means supporting the mold so that it can be disposed between press platens with the parting surfaces of the mold sections extending in a direction from one platen to the other, and with the said one edge and open ends of the entry passages facing said one platen;

a plurality of plungers, one for each entry passage, aligned endwise with the entry passages, respectively;

each plunger having a leading free end portion insertable endwise into, and fitting with close lateral operating clearance in, its associated entry passage;

means supporting the plungers for endwise movement concurrently, from a starting position spaced from said one edge, into said entry passages, respectively, to apply the leading end surface of each of the plungers, under pressure, to a portion of the material exposed in its associated entry passage and contained in the associated mold cavity, and thereby to pressurize all of the material in all of the cavities, concurrently;

means for returning the plungers to starting position;

clamping means operable, prior to entry of said plungers into said cavities, to move said mold sections to closed position and to clamp them in closed position with sufficient force to resist their separation by the pressurized material occasioned by insertion of the plungers to final position into said entry passages, and operable to open the mold sections for unloading the molding articles therein;

metering means disposed at said one edge of the mold and having metering passages extending entirely therethrough and open at both ends and aligned endwise with said entry passages, respectively; each metering passage being of the same cross sectional shape and size, throughout its length, as its associated entry passage and forming therewith in one operating position of the metering means a continuous uniform passage extending from the outer end of the metering passage to the inner end of the entry passage;

said metering means further including closure means operable selectively to open and close the metering passages concurrently, temporarily, at the ends adjacent their associated entry passages;

said plungers being movable to one position in which they partially enter and block the outer ends of the metering passages, respectively, while the closure means are operative to close the other ends of the metering passages;

said metering means further including an injection sprue and runners which lead from the sprue into said metering passages, respectively; and

said plungers being movable concurrently from said one position each entirely through its associated metering passage and into its associated entry passage, while the associated entry passage contains a charge of material and is unclosed by the closure means.

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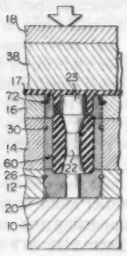
**4,025,269**

## MOLD STRUCTURE AND CAVITY FORMING INSERT ARRANGEMENT THEREFOR

**Donald D. Reinders, Fort Wayne, Ind., assignor to Acro Products, Inc., Fort Wayne, Ind.**

**Filed Feb. 9, 1976, Ser. No. 656,095**
**Int. Cl.² B29F *1/022***
**U.S. Cl. 425—249** **16 Claims**



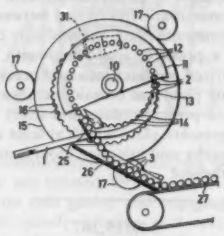

12. In a mold arrangement having insert elements in end to end relation defining a mold cavity therein and superposed plates supporting the respective insert elements, a chamber in the plate supporting an end one of said insert elements and sprue means in the respective end insert element leading from the chamber to the respective cavity, said chamber adapted to receive molding material to be displaced therefrom via said sprue means into said cavity, registering opposed grooves in said end insert element and the supporting plate therefor, a resilient ring in said grooves, and passage means leading from the radially inner side of the groove in said end insert element to said chamber to receive molding material during a molding cycle to press said resilient ring radially outwardly and lock the ring in place in said grooves.

**4,025,270**

## APPARATUS FOR STAMPING CANDY BITS

**Hans Beckers, Monchengladbach, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed Nov. 6, 1975, Ser. No. 629,513**
**Claims priority, application Germany, Nov. 29, 1974, 2456480**
**Int. Cl.² B29C *3/00***
**U.S. Cl. 425—297** **8 Claims**




1. A device for stamping candy bits from a continuous length of confectionary material, comprising revolving laterally open stamping chambers on both sides of which are provided co-revolving axially and oppositely disposed stamping dies which finally shape the material as it is moved into a stamping chamber, said stamping dies being advanced by paired camways and an intervening pressure element into the respective stamping chamber to perform the stamping operation, the candy bit being thereby caused to project into a recess in the stamping zone, characterized in that the pressure element consists of a rotatable roller, the axis of rotation of which extends substantially as a secant with respect to the surface of revolution defined by the axes of the stamping dies.

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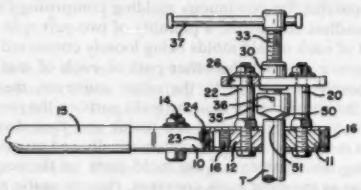
**4,025,271**

## APPARATUS FOR FLARING PLASTIC TUBING

**Glenn R. Wolcott, Papco Tool Corporation, 2044 Webster St., Dayton, Ohio 45404**

**Filed Aug. 25, 1975, Ser. No. 607,225**
**Int. Cl.² B29C *17/00***
**U.S. Cl. 425—318** **7 Claims**




1. Apparatus for flaring an end of a length of polybutylene tubing, comprising,

a. a tool body,

b. a male flaring member having a central axis and a generally conical working face located on one end thereof in centered relation with said axis,

c. said face including a plurality of relatively narrow lands radiating from the center thereof in angularly spaced relation and constituting a minor fraction of the total area of said face,

d. each of said lands being a segment of the surface of a cone defining an angle of substantially less than 45° with a radial plane through the axis of said flaring member,

e. the remainder of said face being composed of an equal plurality of relieved areas alternating with said lands and each defining a substantially larger angle with said radial plane than said lands,

f. means mounting said flaring member on said tool body for axial and rotational movement, and

g. means for clamping a length of tubing to be flared at a predetermined position in said tool body in axial alignment with said flaring member and with an unsupported end portion of said tubing projecting from said clamping means toward said forming member.

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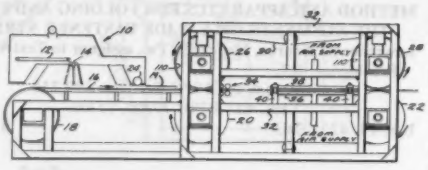
## 4,025,272
## APPARATUS FOR CONTINUOUSLY MANUFACTURING BOARDS

**Stafford V. Camp, III, Courtland, Va., assignor to Southampton Manufacturing Company, Inc., Richmond, Va.**

**Continuation-in-part of Ser. No. 593,199, July 7, 1975, Pat. No. 3,973,893, which is a continuation of Ser. No. 354,906, April 26, 1973, abandoned. This application May 12, 1976, Ser. No. 685,673**

**Int. Cl.² B29C** *15/00*; **B29J** *5/00*

**U.S. Cl. 425—324 R** **3 Claims**



1. Apparatus for continuously manufacturing board from a mixture of board particles and a bonding agent comprising:

means for forming a mat of said mixture;

compressing means for sizing said mat;

a pair of spaced platens;

a pair of endless belts which engage surfaces on opposite sides of the mat and which carry the mat from the mat forming means past the compressing means and between said platens;

means associated with said platens for distributing fluid under pressure against said belts thereby developing fluid bearings between said platens and the belts, and causing said mat to be dimensioned to its final size, said distributing means including:

a. a source of fluid under pressure;

b. a plurality of subcompartments in each platen;

c. controllable regulator means interconnecting the fluid source and said subcompartments whereby fluid is supplied to each subcompartment at a pressure substantially independent of the pressure of fluid in the remaining subcompartments; and

d. at least one hole associated with each subcompartment to permit fluid to pass from said subcompartment through a surface of the respective platen adjacent the belt to thereby develop said fluid bearing; and

means for heating said mat as it is carried between said platens to cure said bonding agent to form the board from said mat.

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## 4,025,273
## MACHINE FOR FORMING DISCRETE QUANTITIES OF MATERIAL INTO A PREDETERMINED SHAPE

**James E. Mauer, and Benedict DiGerlando, both of Plainfield, Ill., assignors to Zartic Frozen Meats, Inc., Plainfield, Ill.**

**Filed Dec. 11, 1975, Ser. No. 639,783**

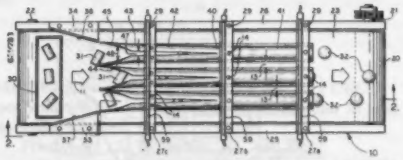
**Int. Cl.² B29C** *15/00*

**U.S. Cl. 425—332** **2 Claims**

1. A machine for uniformly forming each of discrete quantities of proteinaceous material into a spherical shape, comprising:

means,, including a movable surface, for conveying said discrete quantities of material in a predetermined direction;

a plurality of substantially equally spaced, longitudinal members each having a forming portion of substantially semi-circular cross-section, and an integral guiding portion, in advance of said forming portion, having a transversely flared end for assisting in guiding said discrete quantities of said material toward said forming portion; said flared end comprising a pair of guide arms separated by a gap which becomes increasingly wider in the direction opposite said predetermined direction to accommodate said discrete quantities of material of varying widths; and



support means for maintaining said plurality of longitudinal members in substantially parallel relation above said movable surface, with each of said guide arms extending substantially opposite said predetermined direction; said support means including means for independently elevating said forming portions and said guiding portions so that said guiding portions can be elevated above said forming portions to accommodate said discrete quantities of material of varying heights.

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## 4,025,274
## APPARATUS AND PROCESS FOR PREPARING THERMOPLASTIC RESIN COMPOSITION

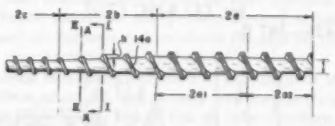
**Masaru Uemura; Tadashi Kasamatsu; Toshimitsu Akiyama, all of Tokyo; Hitoshi Kuroki, Yokohama, and Yujiro Kosaka, Yokosuka, all of Japan, assignors to Toyo Soda Manufacturing Co., Ltd. and Tadashi Kasamatsu, Tokyo, both of, Japan**

**Filed May 21, 1976, Ser. No. 688,568**

**Claims priority, application Japan, Oct. 24, 1975, 50-127355; Oct. 24, 1975, 50-127359; Oct. 24, 1975, 50-127364; Oct. 24, 1975, 50-127365**

**Int. Cl.² B29F** *3/01*

**U.S. Cl. 425—376 B** **16 Claims**



1. An extruder for extruding a thermoplastic resin composition, including a cylindrical body, a screw disposed within said body and heating means disposed about said body, the improvement which comprises:

the cylindrical body has a large bore part, a tapered part, and a small bore part,

the screw has a large diameter flight, a tapered flight, and a small diameter flight which is rotatably disposed within said cylindrical body, and

a plurality of free pass recesses are formed upon said tapered flight.

**4,025,275**

## APPARATUS FOR THE PRODUCTION OF CONTAINERS AND OBJECTS MADE OF THERMOPLASTIC MATERIALS, CARRYING PRINTED MOTIFS

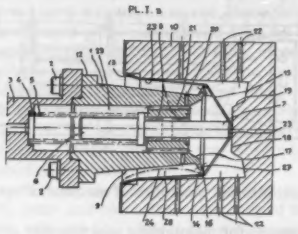
**Maurice Paul Gournelle, demeurant 1 rue des Bruyeres, Asnieres, France**

**Division of Ser. No. 438,406, Jan. 31, 1974, abandoned. This application July 29, 1975, Ser. No. 599,978**

**Claims priority, application France, Jan. 31, 1973, 73.03314**

**Int. Cl.² B29C** *17/00*

**U.S. Cl. 425—387 R** **8 Claims**



1. An apparatus for molding a heated sheet of thermoplastic material having a predistorted motif printed thereon, comprising a die member defining a chamber with a bottom and walls extending from said bottom, means for securing said sheet to the die member in a position extending over the mouth of the chamber, a punch member having a leading face and outer surface adapted for reciprocal movement into and out of the chamber, the leading outermost edge of the punch member defining a leading contact edge for contacting said sheet when the punch is moving into the chamber, the leading outermost edge being formed of two converging surfaces formed by said leading face and a space located around the outer surface of the punch member tapering inwardly and away from said leading outermost edge, a plurality of openings in said two converging surfaces for communicating said surfaces, said leading face and outer surface being shaped and dimensioned to mate with the bottom and walls, respectively, of the chamber, said outer surface being machined with interconnected surface depressions for providing minimum engagement points with said sheet, blowholes in said punch member communicating with said space in the outer walls and said leading outermost edge, and means for selectively providing gas under pressure to said blowholes.

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**4,025,276**

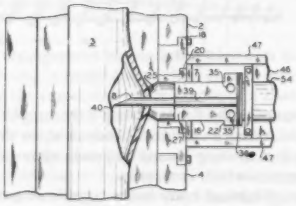
## BLOW MOLDING APPARATUS

**Donald L. Peters, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Feb. 13, 1976, Ser. No. 657,830**

**Int. Cl.² B29C** *17/07*

**U.S. Cl. 425—387 B** **4 Claims**



1. A blow molding apparatus comprising:

a. first and second mold portions forming a cavity, each said portion having a mating surface adapted to engage a mating surface of the other portion;

b. a mandrel with first and second halves each slidably mounted on a respective mold portion adjacent a respective mating surface and movable with a respective mold portion, said first and second halves have portions thereof which are operable to selectively engage a portion of a parison therebetween;

c. first means operably associated with said mandrel for effecting sliding movement of said first and second halves from an extended position wherein said mandrel portions are inside said cavity to a retracted position;

d. a blow needle slidably carried by one of the first and second halves; and

e. second means operably associated with said blow needle for effecting movement of said blow needle between an extended position and a retracted position independent of movement of the mandrel half carrying same wherein in said extended position the needle penetrates the parison and is operable to supply pressurized fluid to the interior of the parison to expand the parison.

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**4,025,277**

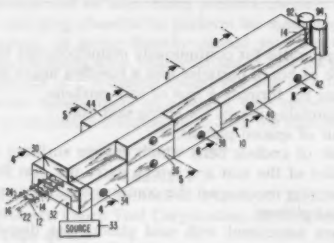
## METHOD AND APPARATUS FOR FOLDING AND FUSING THE ELEMENTS OF A SLIDE FASTENER STRING

**Lawrence S. Monroe, Meadville, Pa., assignor to Textron, Inc., Providence, R.I.**

**Filed June 23, 1976, Ser. No. 699,210**

**Int. Cl.² B29C** *17/00, 15/00*

**U.S. Cl. 425—383** **8 Claims**




1. Apparatus for folding the thermoplastic coupling elements of a slide fastener string comprising

a first electrode,

a second electrode spaced from the first electrode, electromagnetic energy source means connected to said first and second electrodes for creating an electromagnetic field therebetween, and

guide means located between the first and second electrodes and through which the string is drawn, the guide means progressively folding the coupling elements as they are drawn therethrough.

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**4,025,278**

## APPARATUS FOR FABRICATING BOARDS FROM SUGARCANE RIND FIBERS

**Sydney Edward Tilby, 716 E. Ridge Place, Victoria, British Columbia, Canada**

**Filed Mar. 5, 1975, Ser. No. 555,348**

**Int. Cl.² B30B** *1/00;* **B29J** *5/00*

**U.S. Cl. 425—404** **8 Claims**

1. A board forming apparatus in which a mass of sugarcane rind fibers is formed into a unitary board structure, said apparatus comprising:

means defining a collection zone for accumulating a mass of sugarcane rind fibers;

a horizontally reciprocal first-stage plunger having a sweep face disposed behind said collection zone;

a fiber compression zone located adjacent said collection zone;

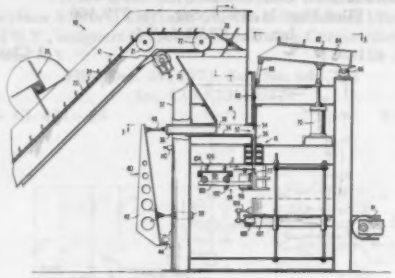
power means for horizontally shifting said first-stage

plunger toward said compression zone to horizontally compact said mass of sugarcane rind fibers in a manner tending to reorient said fibers so that vertical planes containing said fibers are disposed substantially parallel to said sweep face;

a vertical extruder passage being disposed below said compression zone;

a vertically reciprocal second-stage plunger arranged above said compression zone;

power means for vertically shifting said second-stage plunger to push said horizontally compacted sugarcane rind fiber mass downwardly into said extruder passage and vertically compact said sugarcane rind fibers in a manner tending to reorient said sugarcane rind fibers in



substantially horizontal planes to define a board segment comprised of sugarcane rind fibers having their axes disposed substantially parallel to the longitudinal axis of said board segment;

said extruder passage being arranged to receive a column of abutting board segments;

a melting station comprising heating means for heating said board segments and melting natural resinous binder substances thereof; and

a setting station being disposed below said melting station and including cooling means for cooling said board segments and rehardening said natural resinous binder substances to bind together said board segments into a unitary board structure.

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**4,025,279**

## APPARATUS FOR PRODUCTION OF COMPOSITE STRUCTURE FIBERS

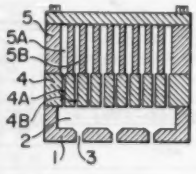
**Takashi Setsuie; Yoshikazu Fujinaga, and Koji Mimura, all of Ohtake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan**

**Filed Jan. 13, 1976, Ser. No. 648,727**

**Claims priority, application Japan, Jan. 21, 1975, 50-9103**

**Int. Cl.² D01D** *5/28*

**U.S. Cl. 425—463** **1 Claim**




1. An apparatus for spinning composite structure fibers by highly distributing at least one spinning component in another spinning component, comprising:

an upper distribution plate provided with a plurality of slit cavities for making at least two spinning components into thin layer streams which are independent from each other;

a lower distribution plate provided with a plurality of fine holes in vertical alignment with said cavities for dividing each of said thin layer streams into a plurality of fine capillary streams which are independent from each other; and

a spinneret plate provided with a bundling space in mutual communication with all of said holes for integrally bundling all of said divided fine capillary streams and extrusion orifices for extruding said bundled streams into filaments, the upper distribution plate, the lower distribution plate, and the spinneret plate being laminated in this order.

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**4,025,280**

## LAMP BURNING VAPORIZABLE LIQUID FUEL

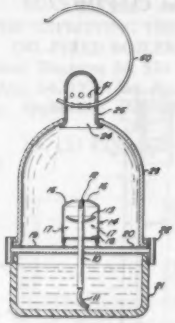
**Leslie Peter Stuart Wilson, Nassau, Bahamas, assignor to Shelton Properties, Limited, Dublin, Ireland**

**Filed Apr. 15, 1974, Ser. No. 460,873**

**Claims priority, application United Kingdom, Apr. 17, 1973, 18514/73; May 30, 1973, 25783/73; June 22, 1973, 29803/73; June 22, 1973, 29837/73**

**Int. Cl.² F23C** *3/02*; **F23D** *3/04*

**U.S. Cl. 431—1** **2 Claims**



1. A lamp for burning a vaporizable liquid fuel with a steady continuous pilot light that is constantly visible along with periodical flashes of brighter light comprising a tubular wick holder having a lower end portion and an upper end portion, a wick in said wick holder, a fuel reservoir below the lower end portion of the wick holder, the wick extending downwardly from the lower end portion of the wick holder into said fuel reservoir, a structure forming a chamber around at least the upper end portion of the wick holder, the chamber structure having an upper end portion and a lower end portion and having at least one constantly open air inlet aperture into the chamber below the upper end portion thereof, a disc fixedly circumposed on the wick holder above the said air inlet aperture, said disc extending from the wick holder to a position slightly spaced from the inner walls of the chamber structure, said chamber structure having its lower end portion closed around the wick holder below the air inlet aperture and the disc and having the end of its upper end portion inturned towards the wick holder to provide a partial top closure cap with the inturned end extending most of the way across and covering the majority of the chamber, said wick having an upper burning end located above the end of the upper end portion of the wick holder, said top closure cap being located adjacent the upper burning end of the wick and the end of the upper end portion of the wick holder, said top closure cap being provided above the upper burning end of the wick and the end of the upper end portion of the wick holder with an opening that lies in a circular pattern mounted on the fuel reservoir and spacedly surrounding the chamber structure

and extending thereabove and above the upper end portion of the wick holder and the holder burning end of the wick therein, means carried by the lantern for admitting air constantly into the region outside of the chamber structure to flow over the top closure cap of the chamber structure and supply air for the wick which burns normally in a pilot flame above the top of the chamber structure using the air supplied from outside the chamber structure, the pilot flame being visible constantly through the lantern, and the pilot flame heating the adjacent part of the chamber structure below the top closure cap so as to cause evaporation of fuel from the exposed wick within said chamber to form a vapor which accumulates in the chamber onto the disc with air constantly entering said chamber through the air inlet aperture from the air admission means carried by the lantern until the mixture is ignited by the pilot flame and ejected from the chamber through the opening in the top closure cap to produce periodically a short duration enlarged flame of brighter light than the pilot flame.

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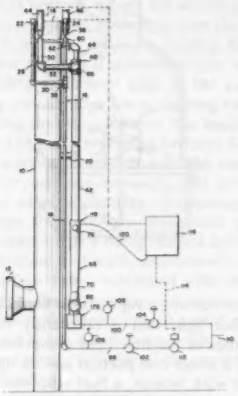
**4,025,281**

## METHOD AND APPARATUS FOR FLARING COMBUSTIBLE WASTE GASES

**Ken O. Lapp, Calgary, Canada, assignor to Westech Industrial Ltd., Calgary, Canada**

**Filed Aug. 8, 1975, Ser. No. 603,167**
**Int. Cl.² F23D** *13/20*
**U.S. Cl. 431—5** **11 Claims**



1. Apparatus for flaring combustible waste gases comprising in combination:

a vertical stack through which combustible waste gases may be discharged, said stack having a base,

a continuously burning pilot assembly mounted adjacent said stack, said pilot assembly comprising:

a vertical tube in substantially parallel and co-extensive spatial relationship with said stack, said tube having a base near the base of said stack,

said vertical tube having an outlet on its upper end in close proximity to the discharge end of said stack and an inlet near its base,

a continuous flame nozzle on the outlet of said vertical tube,

a venturi in fluid communication with the inlet of said vertical tube for mixing air and a combustible raw gas and introducing same into said vertical tube, said venturi being located near the base of said vertical tube,

a source of combustible raw gas connected to said venturi,

a temporary burner mounted adjacent said vertical tube and having a flame retention nozzle in close proximity to said continuous flame nozzle,

a source of combustible raw gas connected to said temporary burner,

momentary igniter means for igniting the mixture of combustible raw gas and air produced by said venturi,

said igniter means being positioned within said vertical tube near the base thereof downstream from said venturi, and

independently controlled first and second valve means for regulating the flow of combustible raw gas to said venturi and said temporary burner.

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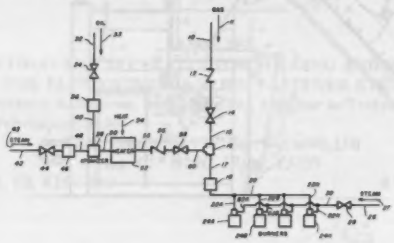
**4,025,282**

## APPARATUS TO BURN LIQUID FUELS IN A GASEOUS FUEL BURNER

**Robert D. Reed, and Hershel Goodnight, both of Tulsa, Okla., assignors to John Zink Company, Tulsa, Okla.**

**Filed May 21, 1975, Ser. No. 579,466**
**Int. Cl.² F23D** *11/44*
**U.S. Cl. 431—11** **3 Claims**



2. In an apparatus for burning gaseous hydrocarbon fuel, the method of burning liquid hydrocarbon fuel, comprising the steps of:

a. atomizing said liquid hydrocarbon fuel into small droplets;

b. mixing said droplets with steam;

c. heating said mixture of liquid droplets plus steam until said droplets vaporize and a mixture of hydrocarbon vapor plus steam is formed; and

d. flowing said mixture of hydrocarbon vapor plus steam under pressure through a circular orifice into a burner tube; while

e. simultaneously flowing steam through an annular orifice coaxial with said circular orifice.

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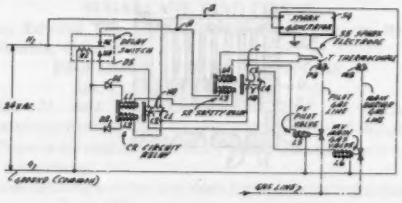
**4,025,283**

## ELECTRICAL IGNITION SYSTEMS FOR GAS FIRED EQUIPMENT

**William A. Ray, 4241 Forman Ave., North Hollywood, Calif. 91602**

**Filed Mar. 18, 1976, Ser. No. 668,226**
**Int. Cl.² F23Q** *9/14*
**U.S. Cl. 431—45** **11 Claims**



1. An automatic electrical control system for gas fired equipment having burner means adapted for usage without a constantly burning pilot, comprising in combination; electric ignition means positioned for igniting a burner, a main valve

means for controlling flow to a main burner; electrical means for controlling actuation of the main valve means; flame responsive means adapted to produce an electrical signal; electrical connections whereby said flame responsive means controls said electrical means for maintaining said main valve in open position, control circuit means responsive to a control instrumentality, said control circuit means including time-delay switch means and circuit means for initial energizing said electrical ignition means and said electrical means for opening the main valve, and circuit means whereby said time delay means shifts control of said main valve means to said flame responsive means after a time delay.

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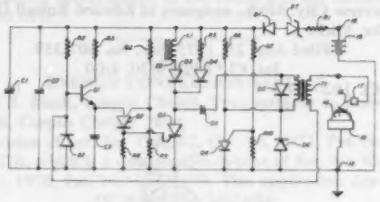
**4,025,284**

## PILOT BURNER REIGNITION SYSTEM

**Lawrence A. Horn, Clay, and Clayton J. Carncross, Utica, both of N.Y., assignors to Liberty Combustion Corporation, Syracuse, N.Y.**

**Filed Dec. 29, 1975, Ser. No. 644,764**
**Int. Cl.² F23N *5/12***
**U.S. Cl. 431—80** **6 Claims**



1. A flame relighting system comprising:
a. a source of not greater than 12 volts DC or rectified AC electrical power;
b. a burner device including an ignitable fuel supply capable of producing a flame;
c. an electrical circuit completed by the presence of said flame between two spaced electrodes;
d. a flyback pulse converter connected to and powered solely by said source and adapted to convert said 12 volts of power to a level of at least 80 volts;
e. capacitive discharge means powered by said flyback pulse converter and adapted to discharge in response to triggering by said flyback pulse converter;
f. means electrically connecting said discharge means to one of said electrodes, said electrical circuit, pulse converter and discharge means being so constructed and arranged that triggering of said discharge means produces a spark between said two electrodes capable of igniting said fuel supply; and
g. SCR switching means effective to cause triggering of said discharge means by said pulse converter in response to a break in said electrical circuit produced by absence of said flame.

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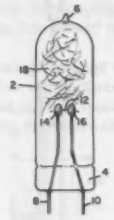
**4,025,285**

## PHOTOFLASH LAMP

**Stephen V. Brown, Winchester, Ky., assignor to GTE Sylvania Incorporated, Montoursville, Pa.**

**Filed Oct. 28, 1975, Ser. No. 625,994**
**Int. Cl.² F21K *5/02***
**U.S. Cl. 431—95 R** **6 Claims**

1. A photoflash lamp comprising:
an hermetically sealed, light-transmitting envelope;
a quantity of combustible fill material located in said envelope;
a combustion-supporting gas in said envelope; and
ignition means disposed in said envelope in operative relationship with respect to said combustible fill material, said ignition means including a pair of lead-in wires extending into said envelope, a filament attached to and extending between said lead-in wires within said envelope, and beads of primer material located on the inner



ends of said lead-in wires and the junctions between the lead-in wires and the filament, said primer material comprising a particulate fuel and binding agent and being free of oxidizers, whereby said primer is dependent on said gas within the envelope for combustion.

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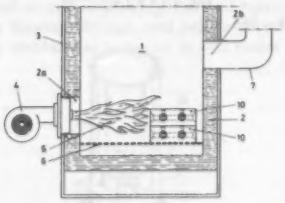
**4,025,286**

## APPARATUS FOR IMPROVING THE OPERATION OF OIL-FIRED BOILERS

**Wilhelm Hüsselmann, Eisenweg 54, 524 Betzdorf, Germany**

**Filed Aug. 14, 1975, Ser. No. 604,639**
**Claims priority, application Germany, Aug. 23, 1974, 2440451**
**Int. Cl.² F23M *9/06***
**U.S. Cl. 431—171** **8 Claims**



1. Apparatus for improving the operation of oil-fired boilers comprising an oil burner and a combustion chamber the wall zone of which is provided with water-conducting cavities, characterized by one or more incombustible blocks (10) which are provided with longitudinal and transverse bores or recesses and are disposed in the combustion chamber (1) at a specific distance in front of the wall (2) situated opposite to the oil burner (4), characterized in that the longitudinal bores or recesses (11) being orientated in the direction of the flame (5) of the oil burner (4) and have a diameter which is larger than that of the transverse bores or recesses (13).

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**4,025,287**

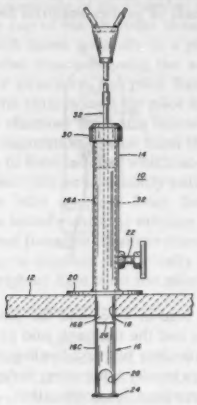
## LIQUID FUEL VAPORIZER DEVICE FOR BAKING FURNACE

**Bernard J. Racunas, New Kensington; Raymond Kastelic, Lower Burrell, both of Pa.; William L. Proctor, Jr., and George E. Moretz, both of Maryville, Tenn., assignors to Aluminum Company of America, Pittsburgh, Pa.**

**Filed Dec. 15, 1975, Ser. No. 640,455**
**Int. Cl.² F23C *5/06***
**U.S. Cl. 431—189** **6 Claims**

1. A device for vaporizing liquid fuel supplied to a furnace chamber under force of gravity, said device comprising an elongated tube adapted to extend vertically into a furnace chamber so that a lower end of the tube is located within the

chamber, a plate covering said lower end, said tube and plate being made of a heat resistant material, openings provided in



the wall of said tube at locations closely adjacent said plate, means on the other, upper end of said tube for receiving liquid fuel for vertical direction to and against said plate.

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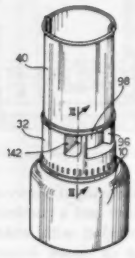
**4,025,288**

## GAS LAMP IGNITER DEVICE

**Lisio Plozner, Via Villanova di Sotto 4, Pordenone, Italy, assignor to Elpinvest S.A., Mauren, Liechtenstein**

**Filed Mar. 8, 1976, Ser. No. 664,722**
**Claims priority, application Italy, Mar. 6, 1975, 67573/75**
**Int. Cl.² F23Q** *2/28*
**U.S. Cl. 431—255** **9 Claims**



1. In a gas lamp of the type having a main mantle burner, mounted on a support structure therefor, an igniter device comprising:

a main valve controlling the flow of gas along a conduit leading to said main burner, said main valve having a shaft with manually operable main control means by which said shaft is turnable about its own axis between first and second limit positions respectively defining the fully closed and the fully open positions of said main valve,

an auxiliary burner for the ignition of the main burner, said auxiliary burner having a nozzle directed towards said mantle of said main burner of said lamp,

an auxiliary valve for controlling the flow of gas to said auxiliary burner,

means connecting said conduit between said main valve and said main burner to said auxiliary valve,

resilient biasing means for biasing said auxiliary valve to its closed position,

an auxiliary control element controlling the opening of said auxiliary valve,

a piezoelectric spark generator having a pair of electrodes between which a spark is generated upon operation of said piezoelectric spark generator, said electrodes being positioned adjacent said auxiliary burner whereby to ignite this upon the generation of sparks between said two electrodes,

mechanical actuator means for operating said piezoelectric spark generator when said main valve is in the fully open position, and

means interconnecting said main control means of said main valve, said mechanical actuator means of said piezoelectric spark generator, and said auxiliary control element controlling said auxiliary valve, whereby operation of said main control element to move said main valve to the fully open position thereof also causes said auxiliary valve to be opened and said piezoelectric spark generator to be operated to ignite said auxiliary burner which in turn ignites said main burner, said auxiliary valve closing when said main control means are released.

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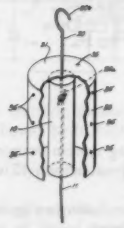
**4,025,289**

## FIREWORKS DEVICE

**Bonnie Sue Duncan, and Edward Russell Duncan, both of Traverse City, Mich., assignors to Edward Russell Duncan, Lake, Mich.**

**Filed Aug. 25, 1975, Ser. No. 607,359**
**Int. Cl.² F42B** *4/20, 4/00*
**U.S. Cl. 102—37.4** **16 Claims**



1. A fireworks device comprising:

a body comprised substantially of a polyethylene material, said polyethylene material comprising the primary, active pyrotechnic ingredient of said fireworks device;

suspension means connected to said body;

ignition means connected to said body and being exposed; and

said suspension means and said ignition means being oriented relative to one another and to said body such that said ignition means is located generally at the bottom of said body when said body is suspended by said suspension means.

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**4,025,290**

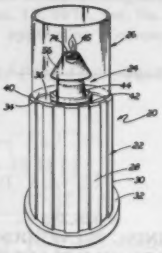
## LAMP

**Clayton Giangiulio, 5 Skyline Drive, Malvern, Pa. 19355**

**Filed Dec. 12, 1975, Ser. No. 640,113**
**Int. Cl.² F23D** *3/18*
**U.S. Cl. 431—324** **13 Claims**

1. In a fluid burning lamp comprising a cannister of combustible fluid into which a wick extends, a top assembly for said cannister for holding a portion of said wick a predetermined distance away from said assembly to provide a flame site, said assembly comprising a tubular portion connected at the top of said cannister and having an open end and a cap member covering said end and including a pair of openings therein, with a web portion between said openings, said web portion including a projecting surface, said wick folded in two at a mid-portion thereof with said mid-portion extending outside said cap between said openings and with the free ends of the wick extending through said tubular member and into the fluid

within said cannister, the projecting surface of said web portion supporting the top of said wick a predetermined distance from the cap member, said cap member also comprising a pressure release port disposed adjacent to said openings and



being sufficiently large to permit fluid to seep therethrough in the event that said fluid expands to a volume greater than that of the cannister while being small enough to preclude fluid from gushing therethrough in the event that the cannister is knocked over.

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**4,025,291**

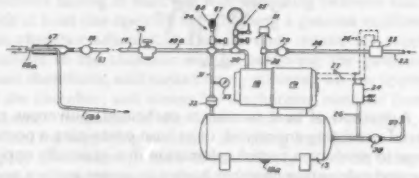
## ENERGY CONVERSION SYSTEM

**Robert B. Black, Corpus Christi, Tex., assignor to Robert B. Black, Corpus Christi, Tex.**

**Division of Ser. No. 192,262, Oct. 26, 1971, Pat. No. 3,844,270, which is a continuation-in-part of Ser. No. 61,776, Aug. 6, 1970, Pat. No. 3,669,079. This application Apr. 18, 1974, Ser. No. 462,094**

**Int. Cl.² F23D** *13/46*

**U.S. Cl. 431—346** **6 Claims**



1. An energy conversion system comprising a storage tank, a compressor having an intake line, means for introducing fuel and air into the intake line to deliver a gaseous mixture of fuel and air to the compressor and including means for adjusting the ratio of fuel and air introduced, a discharge line extended from the compressor to the storage tank to deliver a pressurized gaseous mixture of fuel and air into the storage tank, at least one hollow enclosed burner element defining an interior combustion chamber and having inlet and discharge ports, a gas supply line connected with the inlet port of the burner element and with the storage tank to receive pressurized gaseous mixture from the stoage tank, a needle control valve in the supply line for the burner element, the compressor discharge line and the burner supply line having a common connection with the storage tank, and a flameback arrestor in said common connection.

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**4,025,292**

## HIGH PRESSURE BURNER WITH INTEGRAL PILOT

**A. Preston Bailey, Box 386, Santa Anna, Tex. 76878, and Lawrence J. Sullivan, 2688 E. 25th St., Odessa, Tex. 79761**

**Filed Dec. 15, 1975, Ser. No. 640,589**

**Int. Cl.² F23D** *15/02*

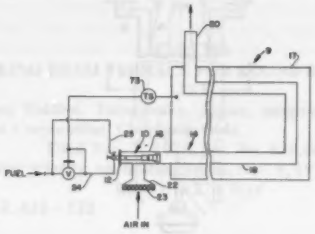
**U.S. Cl. 431—353** **12 Claims**

1. A high pressure burner for direct fired exchangers comprising an elongated mixing barrel having an inlet end and an outlet end, a block affixed to said barrel and having an axial passageway formed therethrough;

a valve stem axially aligned with said axial passageway of said block, an orifice member having a valve seat axially aligned with said barrel;

said valve stem being telescopingly received within said block and movable into seated relationship respective to said valve seat;

seal means which sealingly engage said block and said valve stem to prevent flow therebetween, means by which said seal means and said seat are spaced apart to provide a gas containing chamber therebetween;




means forming a primary gas inlet and a pilot gas inlet into said gas containing chamber, means forming an air inlet port into said barrel;

said primary gas inlet and said pilot gas inlet being flow connected to said gas containing chamber so that gas flowing into the chamber must flow through said seat when said valve stem is spaced therefrom;

said air inlet port being formed in said barrel at a location downstream of said orifice member and upstream of said outlet end so that air flowing into said barrel is admixed with gas flowing through said orifice member, thereby enabling combustion to occur at said outlet end of said barrel.

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**4,025,293**

## PROCESS AND APPARATUS FOR FIRING AND SINTERING OF GRANULAR MATERIAL

**Karl Beckenbach, Eschenweg 2, 4005 Meerbusch 1, Germany**

**Filed Oct. 14, 1975, Ser. No. 621,781**

**Int. Cl.² F27D** *5/00, 1/08*

**U.S. Cl. 432—5** **13 Claims**

1. A process for the firing and sintering of unpreclassified material pieces such as chalk, dolomite, magnesite, cement or the like, in a gas or oil heated shaft furnace, comprising the steps of:

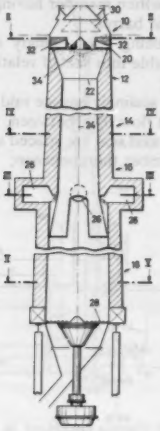
providing the furnace with a plurality of downwardly vertically successive zones including a charging zone, an entry zone, a pre-heating zone, a firing zone and a cooling zone;

feeding the material from the top charging zone and successively through the remainder of said plurality of zones provided in said furnace,

adapting the furnace to have a plurality of radially outwardly disposed burners above the cooling zone;

providing flow effecting means, generally above the entry zone, for achieving a material-size separation following feeding of the material at the charging zone, whereby the surface of the material moving from the charging zone to the entry zone forms a central depression in which relatively coarse pieces of the material pass into the depression and centrally downwardly generally along the fur-

nace longitudinal axis as a central flow column while relatively fine pieces of the material progress downwardly



in a vertical pathway located away from the furnace longitudinal axis.

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**4,025,294**

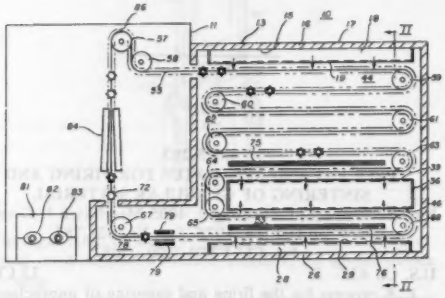
**PARISON OVEN**

**Robert A. Daane, Rockton, Ill.; Edward D. Beachler; Raymond C. Vonderau, both of Beloit, Wis., and Nickolas N. Sokolow, Roscoe, Ill., assignors to Beloit Corporation, Beloit, Wis.**

**Division of Ser. No. 473,290, May 24, 1974, Pat. No. 3,930,788. This application Sept. 19, 1975, Ser. No. 615,182**

**Int. Cl.² F27D** *3/00*

**U.S. Cl. 432—11** **7 Claims**



**1.** A method of heating hollow thermoplastic parisons having inner and outer walls to a target temperature approximately equal to its orientation temperature in an oven including the steps of:

1. placing said parisons in an oven;
2. heating at least a portion of said parisons by contacting said parisons with fluid at a temperature above said target temperature;
3. heating at least a portion of the parisons to a temperature below the distortion temperature of said thermoplastic parison, said distortion temperature being defined as that temperature which if the material is heated to, will cause sufficient damage to at least a portion of the parison surface so that an unsatisfactory container is formed; and
4. applying a fluid at the target temperature to the parisons to equalize the temperature of the inner and outer walls by lowering the temperature of the hotter outer wall and raising the temperature of the inner walls and thereby cause both walls to approach the target temperature.

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**4,025,295**

**METHOD OF BURNING PULVEROUS RAW MATERIAL AND ROTARY KILN PLANT THEREFOR**

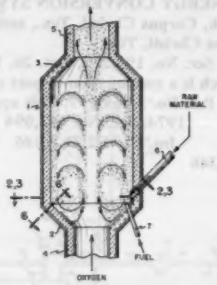
**Jorn Touborg, Copenhagen Valby, Denmark, assignor to F. L. Smidth & Co., Cresskill, N.J.**

**Filed June 18, 1975, Ser. No. 587,864**

**Claims priority, application United Kingdom, June 18, 1974, 27052/74**

**Int. Cl.² F27B** *15/00;* **F26B** *17/00*

**U.S. Cl. 432—14** **34 Claims**



**1.** A method of heat treating a preheated, pulverous raw material consisting entirely of, or at least containing a portion of lime to produce a partial calcination in a generally upright elongated calcination chamber having an upper portion and a lower portion, said lower portion being provided with first means for feeding raw material thereinto and being further provided with an inclined annular bottom wall which tapers downward and inward, said bottom wall being provided with second means for feeding fuel into the lower portion of said calcination chamber comprising:

a. feeding preheated raw material downward through said first feeding means onto said inclined annular bottom wall of said calcination chamber;

b. separately feeding a fuel capable of carrying out at least a partial calcination of the material upward through said second feeding means into the lower portion of said calcination chamber such that said raw material and said fuel enter the lower portion of said calcination chamber in separate and intersecting paths resulting in substantially immediate and intimate mixing;

c. directing a stream of oxygen containing gas upward and generally centrally through said calcination chamber to intersect the path of said material and fuel mixture so as to form eddys as said upward directed gas passes through said calcination chamber to cause said fuel to burn and the individual particles of the raw material to be at least partially calcined substantially isothermally;

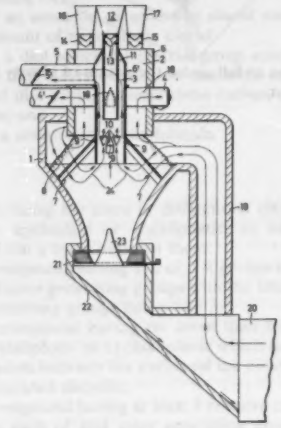
d. passing the at least partially calcined material particles and exit gases out of the chamber in the central gas stream; and

e. separating the particles from said central gas stream.

## 4,025,296
## DEVICE FOR THERMICALLY TREATING GRANULAR AND/OR LUMPY MATERIALS

Heinrich Buchner, Niederkassel-Ranzel, Germany, assignor to Klockner-Humboldt-Deutz Aktiengesellschaft, Germany

Filed Oct. 17, 1973, Ser. No. 403,761
Claims priority, application Germany, Oct. 17, 1972, 2250830
Int. Cl.² F27B 15/00; F26B 17/00
U.S. Cl. 432—58 13 Claims

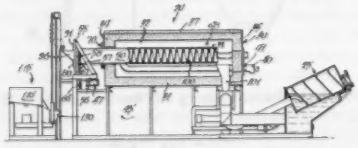


1. A device for thermically treating a granular and lumpy material such as calcite, limestone, dolomite, and magnesite by passing a gaseous medium therethrough, said device comprising a chamber having an upper end and a lower end, said chamber having at least one wall extending between said ends with at least one opening for admitting a gaseous medium into the chamber adjacent the upper end, means for supplying material to the chamber and for removing the gaseous medium therefrom, said means being mounted on the upper end of the chamber, and means for discharging material from the chamber mounted at the lower end of the chamber, said means for supplying material including at least two material supply channels with each of said supply channels being connected to a separate gas discharge conduit, each of the material supply channels extending into the chamber with one of the material supply channels extending further than the remaining channels so that a portion of the gaseous medium passes down through the material which had been supplied by the remaining channels and then through said one channel.

## 4,025,297
## ROTARY RETORT FURNACE

Jonathan Smith, Glen Ellyn, IL; Robert C. Larko, and Eugene E. Booth, both of Meadville, Pa., assignors to Sunbeam Equipment Corporation, Meadville, Pa.

Filed Sept. 22, 1975, Ser. No. 615,281
Int. Cl.² F27B 7/08, 7/14
U.S. Cl. 432—112 4 Claims

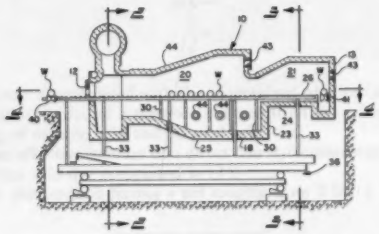


1. A rotary retort furnace comprising an outer shell, said shell having first and second ends, said first end having an opening, a retort extending into said shell through said opening, said retort having a supported end and a cantilevered free end, said retort being unsupported through substantially its entire length between said supported end and said cantilevered free end, said supported end being mounted for rotation by support means external of said shell in proximity to said first end, and said cantilevered free end being within said shell.

## 4,025,298
## WALKING BEAM FURNACE FOR ROUND BAR AND THE LIKE

Tetsuya Tokitsu, Takarazuka, Japan, assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Nov. 7, 1975, Ser. No. 630,064
Claims priority, application Japan, Nov. 8, 1974, 49-129376
Int. Cl.² F27B 9/14
U.S. Cl. 432—122 4 Claims



1. A furnace for heating elongated round workpieces such as round bar and the like comprising:

a floor, a roof, sidewalls, an entrance end wall and an exit end wall defining a longitudinally-extending enclosure having a heat zone portion adjacent said entrance end wall and a soak zone portion adjacent said exit end wall, said floor having a heat portion and a refractory soak portion offset vertically from said heat portion, said floor further having a plurality of longitudinally spaced openings extending therethrough;

a plurality of stationary posts extending vertically-upward from said floor in said heat zone portion, and a plurality of stationary rails secured to said stationary posts and extending longitudinally at least the length of said heat zone portion, the topmost portion of said stationary rails being approximately level with said soak portion of said floor;

a plurality of movable posts extending vertically-upward through said floor openings, a plurality of movable rails secured to said movable posts and extending the length of said enclosure, lift means attached to the bottom of said movable posts for raising, lowering and moving said movable rails with respect to said stationary rails to cause movement of said work through said enclosure;

burner means in said enclosure operable to directly fire above and below said workpieces in said heat zone at a rate sufficient to thermally deform the straightness of said workpieces and directly fire above said workpieces in said soak zone; and

work transfer pitch securing means secured to said rails and formed in said soak floor portion for containing said workpieces as they are walked through said enclosure while insuring line contact of said workpieces with said soak floor portion over substantially the length of said workpieces for substantially straightening any deformation of said workpieces.

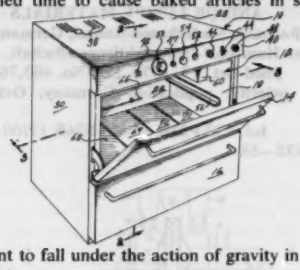
4,025,299

# BAKING OVEN

Jocelyn Dubois, 3344 Montpetit, Ste-Foy, Quebec, Canada

Filed Mar. 29, 1976, Ser. No. 671,576
Claims priority, application Canada, Feb. 18, 1976, 246068
Int. Cl.² F27D 3/00; A21B 3/07
U.S. Cl. 432—129 8 Claims

1. An oven for baking articles such as bread, cakes or the like, comprising: a housing; a forwardly opening cavity in said housing defining a baking compartment; a door closing said cavity; a lower compartment located beneath said baking compartment for receiving baked articles therein; said baking compartment having a bottom shelf separating said baking compartment and said lower compartment, said shelf being formed of a series of pivotably mounted plates adapted to hold articles to be baked; and means for pivoting said plates at predetermined time to cause baked articles in said baking



compartment to fall under the action of gravity in said lower compartment.

## 4,025,300
## PROCESS OF DYEING ARTICLES MADE FROM POLYESTERAMINES

**Yves Vaginay, Lyon, France, assignor to Rhone-Poulenc-Textile, France**

**Filed Jan. 17, 1975, Ser. No. 541,774**

**Claims priority, application France, Jan. 17, 1974, 74.01851**

**Int. Cl.² D06P** *5/00;* **C08G** *63/20*

**U.S. Cl. 8—4** **9 Claims**

1. A process for dyeing shaped articles made from polyesteramines issuing from:

a. at least an aromatic dicarboxylic diacid and possibly a small amount of an aliphatic diacid;

b. at least a diol selected from the group consisting of an aliphatic diol, saturated alicyclic diol and a cycloaliphatic diol, said diol having at least three carbon atoms in the molecule; and

c. at least a compound of the formula

$NR_3$

where R, being the same or different, is alkyl, saturated alicyclic, cycloalkyl or arylaliphatic, or where two R groups form a cycle between them;

said $NR_3$ compound having 1, 2 or 3 R groups containing 0, 1, 2 or 3 ester generating groups with the total number of ester generating groups being 1 to 3;

said $NR_3$ compound having no more than two R groups being arylaliphatic or cycloaliphatic which have only one carbon atom between the cycle and the nitrogen atom or being saturated alicyclic;

said $NR_3$ compound having at least 3 or more carbon atoms between each of said ester generating groups and the nitrogen atom; and

the total amount of said $NR_3$ compound being present so that the percentage of nitrogen fixed on the polymer is from 0.03% to 1.0% by weight of the polymer;

which comprises treating the article with an alkylating agent present in the form of a solution or emulsion in an amount of at least 1.5% by weight based on the weight of said article and at a temperature higher than room temperature for at least 15 minutes while simultaneously dyeing said article with an anionic dye stuff.

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## 4,025,301
## AZO DYES DERIVED FROM 3-AMINO PYRIDINE IN HAIR DYE COMPOSITIONS

**Gerard Lang, Epinay-sur-Seine, France, assignor to Societe Anonyme dite: L'Oreal, Paris, France**

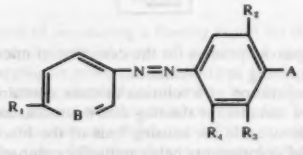
**Filed Sept. 26, 1975, Ser. No. 617,159**

**Claims priority, application Luxembourg, Sept. 27, 1974, 015**

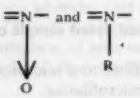
**Int. Cl.² A61K** *7/13*

**U.S. Cl. 8—10.1** **17 Claims**

1. A composition for dyeing hair comprising an aqueous or hydroalcoholic solution of (1) from 0.001 to 1 percent by weight of said composition of at least one dye compound of the formula



wherein B is selected from the group consisting of =N—,



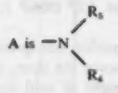
wherein R is lower alkyl containing 1–4 carbon atoms,

$R_1$ is selected from the group consisting of hydrogen, lower alkyl containing 1–4 carbon atoms, lower alkoxy containing 1–4 carbon atoms and chlorine,

$R_2$ is selected from the group consisting of hyrogen, methyl and methoxy,

$R_4$ is selected from the group consisting of hydrogen, methyl, chlorine, nitro, amino and acetylamino,

$R_3$ is hydrogen or together with $R_4$ forms an unsaturated 6-membered ring carrying a hydroxy substituent chelated with one of the nitrogen atoms of the azo link, and



wherein $R_5$ is selected from the group consisting of hydrogen, $—CH_3$, $—C_2H_5$ and $\beta$-hydroxyethyl, and $R_6$ is selected from the group consisting of hydrogen, $—CH_3$, $—C_2H_5$, $\beta$-hydroxyethyl, phenyl and $—CH_2SO_3Na$,

with the proviso that when B is

the anion $X^-$ associated with the quaternized nitrogen atom is the anion residue of a member selected from the group consisting of organic acid and mineral acid, and

2. an effective amount of a direct hair dye compound other than said dye compound in (1),

said composition having a pH ranging from 3 to 11.

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## 4,025,302
## METHOD OF PRODUCING A DYED AND STABILIZED NON-TWISTED FIBER SLIVER AND A FIBER SLIVER WITH MUTUALLY BONDED FIBERS

**Werner Naegeli, Winterthur, and Antonius Schneider, Basel, both of Switzerland, assignors to Pavena AG, Basel, Switzerland**

**Filed Sept. 3, 1974, Ser. No. 502,887**

**Claims priority, application Switzerland, Sept. 13, 1973, 13183/73; Apr. 22, 1974, 5149/74**

**Int. Cl.² D06M** *13/26;* **D06P** *5/00, 7/00*

**U.S. Cl. 8—17** **40 Claims**

1. A method of producing a dyed and stabilized fibre sliver comprising the steps of:

a. impregnating a throughpassing non-twisted fibre arrangement composed of individual fibres with a liquid, said liquid including an effective amount of a chemical compound for mutually bonding the fibres of said fibre arrangement and a dyestuff for dyeing said fibres;

b. squeezing-off excess liquid from the fibre arrangement by application of pressure thereto and condensing the fibres at all sides into a compact non-twisted fibre sliver by said application of pressure;

c. subjecting the compact fibre sliver to elevated temperature;

d. said fibre arrangement being impregnated with said chemical compound which has latent activity upon the material of the fibres at a temperature lower than said elevated temperature and which activates the fibre material at said elevated temperature;

e. simultaneously dyeing and mutually bonding the individual fibres by the fibre material activated by said chemical compound at said elevated temperature;

f. removing said activating chemical compound from said compact sliver; and

g. dying said non-twisted sliver.

33. A stablized and dyed non-twisted fibre sliver produced according to the method according to claim 1, containing individual fibres which are dyed and are mutually bonded by the fibre material.

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## 4,025,303
## DYESTUFF COMPOSITIONS CONTAINING MODIFIED SULFONATED LIGNIN DYE DISPERSANTS

**Gerald Prazak, Charleston, S.C., assignor to Westvaco Corporation, New York, N.Y.**

**Filed July 31, 1972, Ser. No. 276,424**
**Int. Cl.² D06P *1/30***
**U.S. Cl. 8—28** **3 Claims**

1. A dyestuff composition comprising,
a. a plurality of disperse vat dyes, and
b. up to 75% by weight of said dyestuff composition of a dispersant effective as a dye leveler comprising the reaction product of a sulfonated lignin and 0.1% to 90% by weight of magnesium ion from a water-soluble magnesium salt, said reaction product being effective to level at least one of said disperse vat dyes.

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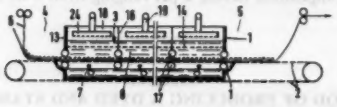
## 4,025,304
## PROCESS FOR THE WET TREATMENT OF TENSION-FREE GUIDED MATERIAL

**Hans Fleissner, Basel, Switzerland, assignor to Vepa AG, Switzerland**

**Filed Sept. 15, 1975, Ser. No. 613,407**
**Claims priority, application Germany, Sept. 14, 1974, 2444123; Oct. 18, 1974, 2449578; Mar. 6, 1975, 2509700**
**Int. Cl.² D06B *3/02***
**U.S. Cl. 8—151** **13 Claims**



1. A process for the wet treatment of fibrous material, which comprises producing a first liquid layer in a container, transporting a fibrous material on a supporting surface of a liquid permeable conveyor support through said first liquid layer, maintaining the liquid level of said first liquid layer above said fibrous material on said supporting surface of said conveyor support, producing a second liquid layer in said container, maintaining the liquid level of the second liquid layer below the first liquid layer to provide a free air space between said first and second liquid layers, and flowing liquid in the first liquid layer, by the effect of gravity, through the fibrous material being transported on said conveyor support, the flow of liquid taking place uniformly through the fibrous material and over said supporting surface.

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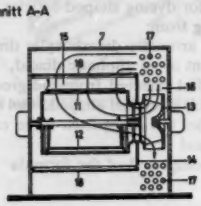
## 4,025,305
## PROCESS FOR THE HEAT-SETTING OF PADDED OR PRINTED CONTINUOUS SYNTHETIC FILAMENT GROUPS

**Heinz Fleissner, Egelsbach near Frankfurt, am Main, Germany, assignor to Vepa AG, Switzerland**

**Continuation of Ser. No. 676,780, Oct. 20, 1967, abandoned. This application Jan. 19, 1973, Ser. No. 325,092**
**Claims priority, application Germany, Oct. 20, 1966, 1635102**
**The portion of the term of this patent subsequent to Apr. 17, 1990, has been disclaimed.**
**Int. Cl.² D06P *5/02***
**U.S. Cl. 8—176** **15 Claims**

1. A process for the continuous pad-dyeing or printing of groups of continuous filaments with disperse dyestuffs which set under the influence of heat, said filaments being selected from the group consisting of synthetic filaments selected from the group consisting of polyolefins, polyamides, polyesters, phenolic resins, polyvinyl materials, acrylate resins, and blends thereof and blends of said synthetic filaments with cellulose filaments, which comprises padding or printing the filament groups with a treatment liquor containing said dyestuffs, conveying said groups over at least one sieve drum means subjected to a suction draft, said sieve drum means




being rotatably mounted in a treatment chamber, and drawing a gaseous treatment medium which has been heated to a temperature of about 170°–230° C. through the filament groups by said suction draft, said gaseous treatment medium being selected from the group consisting of hot air and a steam-air mixture and said filament groups being in the form of tows or top slivers.

4. The process of claim 1, wherein the filament groups are polyester fibers or blends of polyester fibers with other synthetic fibers or cellulose fibers.

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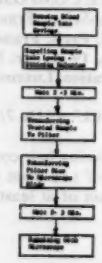
## 4,025,306
## PROCESS AND APPARATUS FOR HEARTWORM MICROFILARIAE DETECTION

**Arnold David Studer, Box 5, West Grove, Pa. 19390**

**Filed Aug. 16, 1976, Ser. No. 714,445**
**Int. Cl.² G01N *33/16, 1/30***
**U.S. Cl. 23—230 B** **9 Claims**



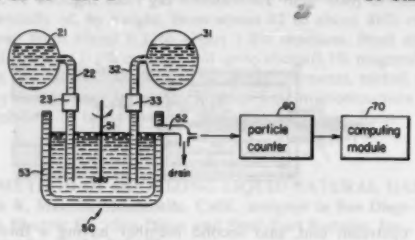
1. An improved process for the detection of microfilariae in blood, comprising in combination,
a. the preparation of a solution mixture containing at least one dye suitable for staining said microfilariae, and components suitable for causing lysis of the blood, said dye and said components being mutually compatible,
b. adding a blood sample to said solution mixture and holding briefly to allow lysis to take place and staining of said microfilariae,
c. filtering the stained, lysed sample on a microporous filter and
d. transferring the filter to a microscope slide for examination for stained microfilariae.

4,025,307

## METHOD AND APPARATUS FOR DETERMINING CRYSTALLIZATION PROPERTIES OF URINE

Alan Randolph; George Drach, and John Daniel Miller, all of Tucson, Ariz., assignors to University Patents, Inc., Stamford, Conn.

Filed Jan. 23, 1976, Ser. No. 651,858
Int. Cl.² G01N 15/06, 21/22, 33/16
U.S. Cl. 23—230 B 20 Claims




15. Apparatus for determining the crystallization kinetics of urine to study stone formation therein, comprising:

first and second feed means for carrying urine-containing solutions;

a mixed suspension mixed product removal crystallizer chamber coupled to said first and second feed means;

particle counting means adapted to receive samples of the output of said chamber; and

computing means responsive to the output of said particle counting means for determining crystallization kinetics occurring in said chamber.

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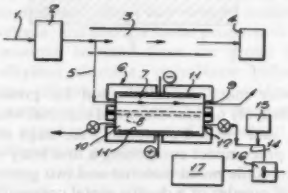
4,025,308

## METHOD AND APPARATUS FOR MONITORING LOW CONCENTRATIONS OF IONS IN A FLOWING FLUID

David James Holman, Blandford Forum, and Howard James, Dorchester, both of England, assignors to United Kingdom Atomic Energy Authority, London, England

Filed June 5, 1975, Ser. No. 583,900
Claims priority, application United Kingdom, June 7, 1974, 25458/74
Int. Cl.² G01N 27/40
U.S. Cl. 23—230 R 12 Claims



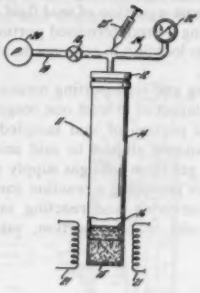
9. A method of monitoring a flowing liquid for the presence of low concentrations of ions of a selected species which resides in tapping an isokinetic sample from the flowing liquid, flowing the sample through a chamber in which the flow is presented to a porous membrane whose pore size lies between 0.2 and 0.9 micrometers whilst maintaining an electrical potential on the side of the membrane remote from the flowing sample and effecting electro-transport of selected ions from the flowing liquid through the membrane into a volume substantially free of said ions whereby said ions become concentrated in the volume of liquid, continuing the isokinetic sample flow until a concentration of ions sufficient for measurement has been achieved and then measuring said concentration.

4,025,309

## CARBON NITROGEN TEST SYSTEM

Clifford C. Hach, Ames, Iowa, assignor to Hach Chemical Company, Ames, Iowa

Filed Feb. 26, 1976, Ser. No. 661,741
Int. Cl.² G01N 7/08, 25/24, 31/10, 31/12
U.S. Cl. 23—230 PC 4 Claims



1. An analytical method for determining the elemental carbon and nitrogen contents of a sample, which comprises:

mixing a predetermined amount of said sample, in finely divided form, with an excess of a cupric oxide oxidizing agent,

evacuating a pressure vessel containing said mixture,

heating said mixture to a temperature sufficient to effect oxidation of said sample and thereby convert carbon to $CO_2$, nitrogen to $N_2$, and hydrogen to water,

cooling said vessel to condense water,

determining the resulting gas pressure as a measure of the total carbon plus nitrogen content of the original sample,

withdrawing a predetermined volume of said gas,

sorbing $CO_2$ from said predetermined volume of gas,

and determining the change in volume of said gas as a measure of the ratio of carbon to nitrogen in the original sample.

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4,025,310

## METHOD FOR READING A WET FLUORESCENT SURFACE

Gunner Bolz, Santa Clara; Fred H. Deindoerfer, Northridge; Charles R. Gifford, Santa Clara, and Naomi Kameda, Foster City, all of Calif., assignors to International Diagnostic Technology, Inc., Santa Clara, Calif.

Filed May 28, 1976, Ser. No. 690,975
Int. Cl.² G01N 21/22, 33/16
U.S. Cl. 23—230 B 13 Claims

1. In an improved method for the quantitative measurement of the signal from a fluorescent label on a solid support surface received by the optical fluorescence collection end of a fluorometer, the improvement comprising fluorometrically reading the signal while the surface is coated with a continuous aqueous layer, said surface being exposed to the ambient atmosphere and being free of a liquid volume contained independently of the surface during said reading, said fluorometer collection end being spaced apart from said aqueous layer.

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4,025,311

## PROGRAMMED FLUID SAMPLING AND ANALYSIS APPARATUS

Julius H. Bochinski, 26 Redding Ridge Drive, Gaithersburg, Md. 20760

Filed Jan. 9, 1976, Ser. No. 647,776
Int. Cl.² B67D 5/40; G01N 31/00
U.S. Cl. 23—253 R 25 Claims

1. A controlled apparatus for incrementally sampling a fluid in order to subject a discrete portion of the sampled fluid to

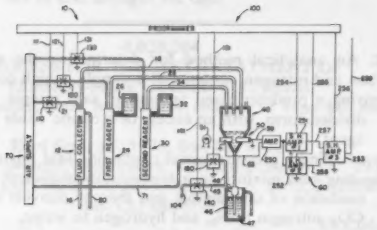
analysis and having the capability of transporting at least said discrete portion of the sampled fluid free from contact with mechanical pumps by propulsion caused by gas, said apparatus comprising the combination of:

gas supply means for supplying gas to propel said discrete fluid portion and at least a reagent in said apparatus in a predetermined sequence upon command;

fluid collecting and transporting means for both discretely collecting at least a portion of said fluid at a first location and transporting a predetermined portion of the sampled fluid to another location in response to a gas from said gas supply means;

reagent collecting and transporting means for both collecting a known aliquot of at least one reagent related to said predetermined portion of said sampled fluid and transporting said known aliquot to said another location in response to a gas from said gas supply means;

reactor means for providing a reaction zone at said another location for receiving and reacting said sampled fluid portion and said reagent portion, said reactor means



including means for draining the reactor means of spent solution of said sampled fluid and said reagent in response to gas from said gas supply means;

means for programming the transportation of the predetermined portion of the sampled stream from said fluid collecting and transport means and said reagent portion from said reagent collecting and transport means by programming the supply of a gas to said fluid collecting and transport means and said reagent collecting and transport means;

means for analyzing the reaction products in said reaction zone to determine the ion concentration of predetermined chemicals of said fluid; said draining means being in communication with said gas supply means and said reaction zone for draining said reaction means from said reaction zone after analysis of said reaction products is complete in response to a gas from said gas supply means controlled by said programming means; and

means in circuit with said analyzing means and said programming means for providing a signal represenative of said analysis.

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**4,025,312**

**APPARATUS FOR MAKING CARBON BLACK**

**Eulas W. Henderson, Oregon, Ohio, assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Jan. 27, 1976, Ser. No. 652,694**

**Int. Cl.[2] C01B** *49/00;* **C09C** *1/48;* **C10B** *47/00*

**U.S. Cl. 23—259.5** **8 Claims**

1. An apparatus for producing carbon black, said apparatus including:

a. an elongate housing;

b. a first member mounted in said housing and forming a converging/diverging venturi, said member having an upstream end;

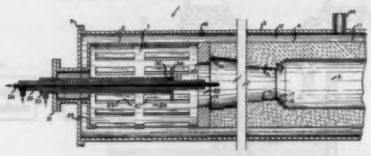
c. first means forming a precombustion chamber in said housing adjacent to and upstream of said upstream end;

d. air inlet means communicating with said precombustion chamber operable for introducing air generally tangentially into the precombustion chamber;

e. second means communicating with said precombustion chamber and operable to introduce a combustible fuel thereinto;

f. a first tubular member extending axially into said precombustion zone and operable for introducing feed oil into one of said precombustion chamber and said venturi; and

g. a second member positioned in said housing adjacent said



upstream end, said second member having a through opening providing an upstream opening for the first member and thereby providing flow communication between said precombustion chamber and said venturi whereby air and the fuel flow from the precombustion zone through the opening into the venturi, said opening being smaller than the upstream end of said venturi and said second member and said first member cooperating with one another for preventing flow of fluid into the upstream end of the venturi except through said opening.

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**4,025,313**

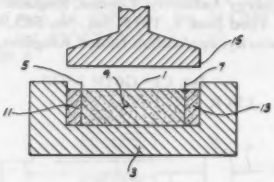
**ROLLED STOCK OF POWDER METALLURGICALLY-FORMED, NONDUCTILE MATERIAL AND METHOD OF PRODUCTION**

**Hendrick J. Slaats, Attleboro, Mass., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed July 24, 1974, Ser. No. 491,591**

**Int. Cl.[2] B22F** *7/00*

**U.S. Cl. 428—584** **8 Claims**



1. A powder metallurgical method for producing rolled stock of a relatively nonductile metal material which is free of edge cracks, said method comprising the steps of:

forming a precompact comprising a first body of powder of said nonductile metal material and two generally parallel bodies of powder of a ductile metal compatible with said nonductile material which extend along respective side edges of said first body of powder;

compressing said precompact to form a compact of said nonductile material having borders of said ductile metal extending along the side edges thereof and having two generally parallel faces extending between said side edges thereof;

sintering said compact to form a bordered ingot;

rolling the bordered ingot in a direction parallel to said borders by applying rolling force to said generally parallel faces whereby the thickness of said ingot is reduced while formation of edge cracks in said nonductile material is inhibited during said rolling; and

trimming said borders from said ingot to form said rolled stock,

## 4,025,314
## NICKEL-CHROMIUM FILLER METAL

**Edward Peter Sadowski, Ringwood, N.J., and Piyush Champakal Shah, Ahmedabad, India, assignors to The International Nickel Company, Inc., New York, N.Y.**

**Filed Dec. 17, 1975, Ser. No. 641,687**
**Int. Cl.² B32B *15/00*; C22C *19/05***
**U.S. Cl. 428—680** **11 Claims**

1. A wrought inert gas shielded-arc filler alloy consisting essentially of, by weight, from about 42 to about 46% chromium, from about 0.1 to about 1.8% titanium, from about 0.01 to about 0.1% carbon, and up to about 0.1% magnesium, with the balance, apart from incidental elements, nickel; said alloy being characterized by an austenitic microstructure and capability for being hot and cold worked to wire form.

## 4,025,315
## METHOD OF ODORIZING LIQUID NATURAL GAS

**Jack R. Mazelli, Montebello, Calif., assignor to San Diego Gas & Electric Co., San Diego and Dual Fuel Systems, Inc., Los Angeles, both of, Calif.**

**Filed May 19, 1971, Ser. No. 144,796**
**Int. Cl.² C10J *1/28*; C10L *1/24***
**U.S. Cl. 44—52** **15 Claims**

1. A method of odorizing liquid natural gas comprising the steps of:

a. forming a mixture of a diluent and an odorant selected from the class of odorants consisting of ethyl mercaptan and methyl mercaptan, the diluent having a freezing point at atmospheric pressure below the boiling point of liquid natural gas at that pressure; and

b. introducing the mixture in an odorant effective amount into the liquid natural gas.

## 4,025,316
## MANNICH BASE REACTION PRODUCTS USEFUL AS LIQUID HYDROCARBON ADDITIVES

**William Harold Stover, Sombra, Canada, assignor to Exxon Research and Engineering Company, Linden, N.J.**

**Filed Nov. 6, 1974, Ser. No. 521,282**
**Int. Cl.² C10L *1/22***
**U.S. Cl. 44—58** **8 Claims**

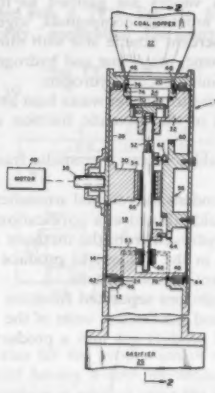
1. A combined lubricant and fuel composition for the lubrication of a 2-stroke cycle gasoline engine which comprises a gasoline to which has been added a minor amount of petroleum lubricating oil containing an oil soluble Mannich base as a detergent-antiscuff additive, said Mannich base comprising the reaction product of: about two molar proportions of $C_{14}$-$C_{24}$ mono alkyl phenol, about two to eight molar proportions of a formaldehyde, and about a molar proportion of a nitrogen containing material selected from the group consisting of ammonia, alkylene diamine, polyalkene polyamines, and hexamethylene tetramine, and wherein: said oil has been added in an amount of from about 1 to 5 parts and said Mannich base has added in an amount of from about 0.03 to 0.75 parts, per 100 parts of gasoline.

## 4,025,317
## HIGH PRESSURE ROTARY PISTON COAL FEEDER FOR COAL GASIFICATION APPLICATIONS

**Hasan T. Gencsoy, Morgantown, W. Va., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Aug. 12, 1976, Ser. No. 713,751**
**Int. Cl.² C10J *3/30*, *3/50***
**U.S. Cl. 48—86 R** **6 Claims**

1. A coal transfer device for transferring pulverized coal from a coal hopper to a coal gasifier operable at a substantially higher pressure than that within said hopper, comprising a hollow casing having diametrically opposed openings, one of which is in open communication with said hopper and the other of which is in open communication with said gasifier, a discoidal rotor disposed and rotatable within said casing an having a cavity therein defining a cylinder in open registry with the periphery of the rotor, seal means intermediate said rotor and said casing for interrupting fluid communication betweeen said openings, a piston disposed in said cylinder, a piston rod attached to said piston and projecting diametrically through the rotational axis of said rotor, contoured stationary cam means carried by said casing, cam follower means affixed to said piston rod and engaging said cam means, and drive

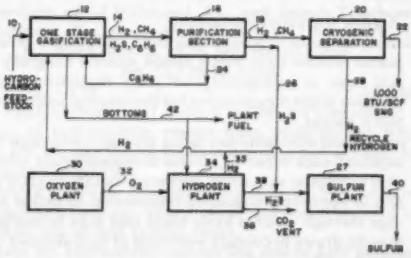


mans coupled to said rotor for rotating said rotor about said axis while simultaneously driving said cam follower means along the contour of said cam means for reciprocating said piston within said cylinder, said contour of the cam means being of a configuration wherein the piston is displaced towards and maintained at a location contiguous to the outermost periphery of said rotor while the piston is in open communication with said gasifier for inhibiting gas therefrom from entering said cylinder.

## 4,025,318
## GASIFICATION OF HYDROCARBON FEEDSTOCKS

**Burton E. Moody, and John E. Schuster, both of Allentown, Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.**

**Continuation-in-part of Ser. No. 614,408, Sept. 18, 1975, abandoned. This application Oct. 5, 1976, Ser. No. 729,740**
**Int. Cl.² C01B *2/16***
**U.S. Cl. 48—213** **18 Claims**




1. A method of producing a pipeline gas having a heating value of about 1,000 BTU/SCF from a hydrocarbon feedstock selected from the group consisting of crude oil, bitumen from tar sands, shale oil, liquid volatiles resulting from coking of

coal, liquefied coal resulting from solvating coal with a solvent and hydrogen, aromatic hydrocarbons, naphtha, gas oils, crude oil distillates, and crude oil residues and mixtures thereof comprising the steps of:

vaporizing the hydrocarbon feedstock preheated to about 700° F in the presence of hydrogen at a temperature in excess of 750° F to produce a feedstream of hydrocarbon feedstock vapors and excess hydrogen;

injecting said feedstream into an adiabatic gasification vessel maintained at a pressure in excess of 75 psig and a temperature in excess of 1,550° F wherein the hydrocarbon feedstock vapors are gasified to form essentially methane and aromatic compounds, together with less than 5 mole percent ethane and with minor amounts of ethylene, propane, propylene and hydrogen sulfide in an effluent containing excess hydrogen;

cooling the effluent to recover waste heat and condensing a major portion of the aromatic fraction of said gasifier effluent;

separating out said condensed aromatic fraction from said effluent;

removing non-condensible residual aromatics and hydrogen sulfide from said effluent in a purification zone;

separating the hydrogen from the methane and other light hydrocarbons in the effluent to produce a product gas consisting essentially of methane;

returning the hydrogen separated from the effluent to the vaporization and gasification units of the process; and

discharging said product gas into a product receiving device.

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**4,025,319**

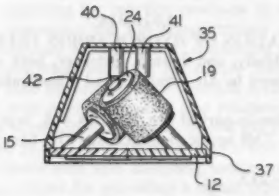
**KNIFE SHARPENER**

**Valy Z. Smith, 4363 W. Dean Road, Brown Deer, Wis. 53223**

**Filed Dec. 24, 1975, Ser. No. 644,100**

**Int. Cl.² B24B** *23/02*

**U.S. Cl. 51—208** **9 Claims**




1. A knife sharpener comprising:

similar individual subassemblies each including a generally planar molded base, pintle means molded integrally with said base and projecting obliquely therefrom, and an abrasive roller means journaled for rotation solely on said pintle means,

a pair of said subassemblies being arranged with their bases adjacent each other in reverse complementary relationship to dispose said roller means proximate to each other and in oppositely angulated relationship to define a passage through which a knife blade that is to be sharpened may be drawn in contact with each of said abrasive roller means, and

molded housing means constructed and arranged for engaging with said bases jointly and for concealing said roller means, said housing means having a slot aligned with said passage to enable drawing a knife against said roller means.

**4,025,320**

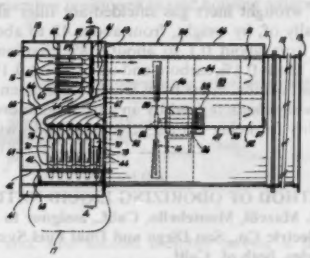
**DRY DUST COLLECTOR**

**Michael J. Amoroso, Marion, Ill., assignor to M.A.T. Industries, Inc., West Frankfort, Ill.**

**Filed June 11, 1975, Ser. No. 585,971**

**Int. Cl.² B01D** *45/12*

**U.S. Cl. 55—1** **13 Claims**



1. In an apparatus for removing dust in an air ventilation duct:

a. duct means having a longitudinal axis and including an inlet opening, and an outlet opening longitudinally spaced therefrom,

b. blower means in the duct means creating an airflow from said inlet opening to said outlet opening,

c. a first bank of venturi tubes having centrifugal separator vane means and being mounted within said duct, each of said tubes having an inlet orifice, an outlet orifice and an open throat disposed therebetween, said tubes receiving air from said duct means and passing a portion of said air longitudinally therethrough and said vane means diverting a portion of said air transversely through said throats,

d. a first throat chamber means connecting with said throats and receiving said diverted air from said first bank of tubes,

e. conduit means connecting with said throat chamber means and including a return opening means connecting with said duct means,

f. said blower means being located in said duct means to provide a relatively lower pressure at the return opening means than at the throat chamber means to circulate diverted air from said throat chamber means to the return opening means without the need for an auxiliary blower in the conduit means,

g. dust extraction means mounted within said conduit means between said throat chamber means and said return opening means to extract dust from at least a portion of said diverted air, and

h. dust receptacle means connecting with said dust extraction means to receive said extracted dust.

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**4,025,321**

**PURIFICATION OF NATURAL GAS STREAMS CONTAINING OXYGEN**

**Richard Alan Anderson, Katonah; Karl Gardner Davis, Suffern, and Ervine Stout Holmes, Yorktown Heights, all of N.Y., assignors to Union Carbide Corporation, New York, N.Y.**

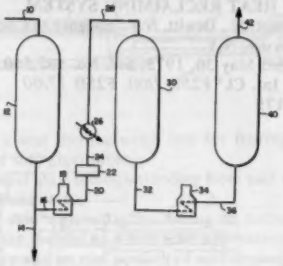
**Filed Sept. 30, 1975, Ser. No. 618,062**

**Int. Cl.² B01D** *53/04*

**U.S. Cl. 55—33** **5 Claims**

1. Process for purifying a hydrocarbon feedstock containing at least one sorbable impurity selected from the group consisting of water, carbon dioxide hydrogen sulfide and alkyl mercaptan which comprises passing said feedstock through a first fixed bed of activated zeolitic molecular sieve having pore diameters large enough to adsorb the said impurity, with the proviso that the said fixed bed is at a temperature of less than 150° F. when said hydrocarbon feedstock also contains from

10 to 10,000 ppm by volume of gaseous oxygen, terminating the passage of the feedstock through the bed prior to breakthrough of the impurity adsorbed therein, thereafter desorbing and removing the adsorbed impurity from said first bed by purging same counter-currently with a non-sorbable hydrocarbon purge gas previously containing from 10 to 10,000 ppm by volume of molecular oxygen, said oxygen-containing hydrocarbon purge gas stream having been treated by the steps



of (a) reducing the said oxygen content thereof by reacting the oxygen with hydrocarbon molecules comprising the said gas stream, and (b) passing the oxygen-depleted hydrocarbon gas stream together with at least some of the oxygen-containing reaction products produced in situ therein through a second fixed bed of activated zeolitic molecular sieve adsorbent, the temperature of the gas stream being less than 350° F., and said molecular sieve bed being at a temperature of greater than 350° F.

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**4,025,322**

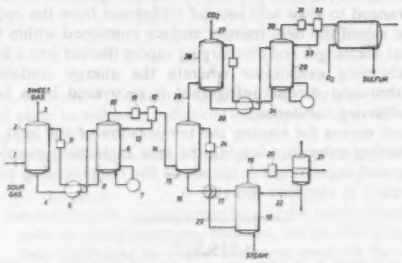
## REMOVAL OF HYDROCARBONS AND WATER FROM ACID GAS STREAMS

**Edwin J. Fisch, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.**

**Continuation of Ser. No. 578,844, May 19, 1975, abandoned. This application Apr. 30, 1976, Ser. No. 681,872**

**Int. Cl.² B01D** *53/14*

**U.S. Cl. 55—48** **6 Claims**



1. A process for the removal of $H_2S$, $CO_2$ and aromatic hydrocarbons from sour gases, comprising, (A) contacting the sour gas in an absorption zone and absorbing the $H_2S$, $CO_2$, and aromatic hydrocarbons with a selective aqueous absorbent mixture and producing a sweet product gas stream and a loaded absorbent; (B) passing the loaded absorbent to a first desorption zone and regenerating the loaded absorbent and producing a gas stream containing principally $H_2S$, $CO_2$ and aromatic hydrocarbons; (C) selectively absorbing the aromatic hydrocarbons from the gas stream, and producing an aromatic hydrocarbon-rich absorbent and an $H_2S$, $CO_2$-containing gas stream; (D) passing the aromatic hydrocarbon-rich absorbent to a second desorption zone and regenerating the aromatic hydrocarbons from the aromatic hydrocarbon-rich stream, and recovering the aromatic hydrocarbons; (E) selectively absorbing $H_2S$ from the $H_2S$, $CO_2$-containing gas stream to produce a $CO_2$-containing stream and an $H_2S$-rich absorbent; (F) and regenerating the $H_2S$-rich absorbent to produce an $H_2S$-containing gas stream containing a high proportion of $H_2S$.

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**4,025,323**

## ELECTROSTATIC PRECIPITATOR WITH TELEVISION RECEIVER

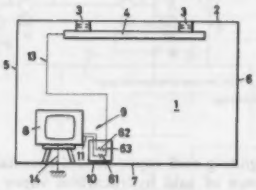
**Constantin Graf von Berckheim, Friedrichstrasse 9, Weinheim, Germany**

**Filed Feb. 4, 1976, Ser. No. 655,043**

**Claims priority, application Germany, Feb. 22, 1975, 2507794**

**Int. Cl.² B03C** *3/00*

**U.S. Cl. 55—139** **19 Claims**



1. An apparatus for the production of an electrostatic direct-current field having a first electrode to which a high direct-current voltage is applied using the high voltage power supply of a television receiver, and a counterelectrode that is at ground potential, a connector set comprising a voltage divider having a resistance value of at least $10^7$ ohms, connected between the ground and the direct-current output of the high voltage picture tube power supply of the television receiver, a tap on the voltage divider serving as the connection to the first electrode, and a connector providing the connection to the direct-current output of the television receiver, said connector fitting between connecting means consisting of a plug and socket between the high-voltage power supply and the anode of the picture tube of said television receiver, the said connector having on one side a first plug-in contact attached to the anode plug-in connecting means of the picture tube, and a sealing cup surrounding said first plug-in contact, and on the other side a second plug-in contact equal to the anode plug-in connecting means and a surface surrounding the said second plug-in contact in engagement with the sealing cup of an anode plug-in contact connected to the high voltage power supply.

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**4,025,324**

## HYDROCARBON VAPOR CONTROL UNIT AND SYSTEM

**James H. Stackhouse, Jr.; Edward G. Craze, Jr.; John A. Morrison, all of Richmond, Va., and Joseph T. Scheurich, Beaumont, Tex., assignors to Texaco Inc., New York, N.Y.**

**Filed Sept. 8, 1975, Ser. No. 611,058**

**Int. Cl.² B01D** *53/04*

**U.S. Cl. 55—179** **15 Claims**

1. Hydrocarbon vapor control system for eliminating discharge of hydrocarbon vapors from underground storage tanks and the like during product handling and storage, comprising in combination

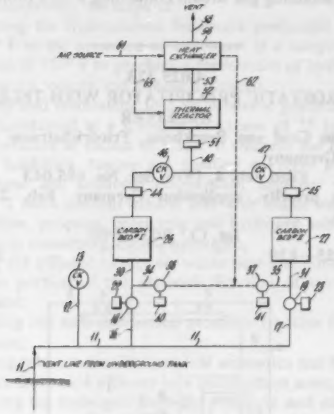
a pair of means for containing an adsorption bed for moving said hydrocarbon vapor from a vent line connected to at least one of said storage tanks,

means for alternatively connecting one of said adsorption beds to said vent line,

means associated with said adsorption beds for detecting the presence of said hydrocarbon vapor in the effluent therefrom,

a thermal reactor connected to receive the effluent from

said adsorption beds and having means for supplying air to support combustion in the reactor, and



means for igniting said vapor in said thermal reactor after the presence of said hydrocarbon vapor has been detected.

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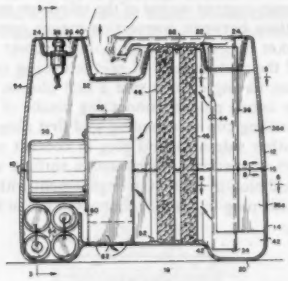
**4,025,325**

## PORTABLE VENTILATING AIR FILTERING DEVICE FOR TOILETS

**Vernon Goodwin, Jr., Seattle, Wash., assignor to Pleasantaire Industries, Ltd., Seattle, Wash.**

**Filed Dec. 29, 1975, Ser. No. 644,502**
**Int. Cl.² B01D** *46/10*
**U.S. Cl. 55—357** **11 Claims**



1. A portable air ventilating deodorizing filter device for toilets which include a toilet stool comprising a bowl having an upper rim and a base adapted to be positioned on a floor, comprising an elongated housing having a generally flat bottom and a top interconnected by opposite housing ends and sides to form an airtight enclosure, filter panel means mounted in upright position transversely spanning the housing interior substantially from top to bottom and side to side to divide the housing interior into a receiving plenum space in one end of the housing and a collecting plenum space in the opposite end of the housing, blower means operatively mounted in said housing having an outlet discharging through an opening in the housing and having an inlet communicating with the collecting plenum, intake means comprising an upright intake duct having a transversely disposed intake nozzle head on its upper end adapted for insertion between a toilet seat and said toilet bowl rim, an upright guide mounted inside said housing slidably supporting the intake duct in said receiving plenum to permit adjustive elevation of said nozzle head to different heights above the housing, said guide having means which permit the lower end of the intake duct to remain in communication with the receiving plenum in all vertically adjusted operative positions of said duct supported by said guide, said duct being retractable substantially fully within said housing to locate the nozzle head upon the top of the housing for carrying and stowage.

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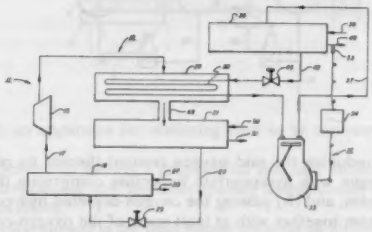
**4,025,326**

## HEAT RECLAIMING SYSTEM

**Louis H. Leonard, Jr., Dewitt, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.**

**Filed May 30, 1975, Ser. No. 582,560**
**Int. Cl.² F25B** *7/00*; **F25D** *17/00*
**U.S. Cl. 62—175** **3 Claims**



1. Apparatus for reclaiming energy from a refrigeration system including

a first closed loop vapor compression refrigeration circuit having a mechanical compressor arranged to discharge vapors of a first refrigerant into a condenser,

a heat exchanger interposed between the compressor and the first condenser of the first circuit being operatively arranged to bring vapors of the first refrigerant discharged from said compressor into contact with one side of a heat transfer surface prior to said refrigerant entering said condenser,

a second closed loop vapor compression refrigeration circuit having a reciprocating compressor being capable of raising the temperature of a second refrigerant and being arranged to draw said second refrigerant from the opposite sideof the heat transfer surface contained within the heat exchanger and discharging vapors thereof into a heat reclaiming evaporator wherein the energy contained within said second refrigerant is recovered by a heat reclaiming substance,

control means for sensing the temperature of the heat reclaiming substance leaving the heat reclaiming evaporator and regulating the output of the reciprocating compressor in response thereto.

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**4,025,327**

## METHOD FOR FABRICATING A MASS SPECTROMETER INLET LEAK

**Robert F. Harris, Annapolis, Md., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Nov. 26, 1975, Ser. No. 635,519**
**Int. Cl.² C03B** *23/08*; **C03C** *27/02*
**U.S. Cl. 65—54** **14 Claims**

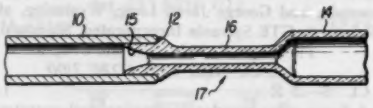
1. A method of fabricating an inlet leak for a mass spectrometer comprising the steps of:

wet hydrogen firing an internal segment of high melting point metal tubing at a temperature range from 900° C to 1000° C to oxidize said internal segment for sealing to a glass tubing;

inserting a length of said glass tubing formed of a selected high melting point glass having a coefficient of expansion

substantially the same as said metal tubing into said oxidized segment of said metal tubing, said glass tubing having an outer diameter substantially the same as the inner diameter of said metal tubing;

heating said glass tubing in the region of said oxidized segment to a molten state for causing said molten glass to adhere to said oxidized segment of said metal tubing to




form a seal therebetween and for flairing said inserted end of said glass tubing;

heating said glass tubing extending from said metal tubing to a softened state;

drawing said softened glass tubing to reduce the interior diameter thereof to a fine leak apperature; and

breaking away an end portion of said drawn glass tubing to complete said inlet leak.

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## 4,025,328
## METHOD OF MANUFACTURING MICROCHANNEL PLATE HAVING ROUNDED INPUT FACES

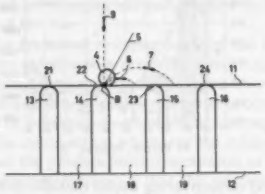
**Remy Henri Francois Polaert, Villecresnes; Alphonse Ducarre, Ste Genevieve des Bois; Valere Dominique Louis Duchenois, Paris, and Jean Rodiere, Saint-Maur, all of France, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed June 25, 1975, Ser. No. 590,317**

**Claims priority, application France, July 3, 1974, 74.23128**

**Int. Cl.² C03B** *31/00, 25/00;* **H01J** *39/00*

**U.S. Cl. 65—111** **4 Claims**




1. A method of treating the input face of a glass microchannel plate to enhance radiation interception thereof, comprising the steps of:

heating the input face of the glass microchannel plate to a temperature close to but below the softening temperature of the glass;

bombarding the heated input face of the microchannel plate with an energy-carrying beam of 100 to 200 W/cm² for a time sufficient to round the input ends of the channel walls of the microchannel plate to enhance radiation interception.

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## 4,025,329
## PARTICULATE UREA-FORMALDEHYDE FERTILIZER COMPOSITION AND PROCESS

**Harvey Maurice Goertz, Marysville, Ohio, assignor to O. M. Scott & Sons Company, New York, N.Y.**

**Filed Dec. 4, 1975, Ser. No. 637,821**

**Int. Cl.² C05G** *3/02;* **C05C** *9/02*

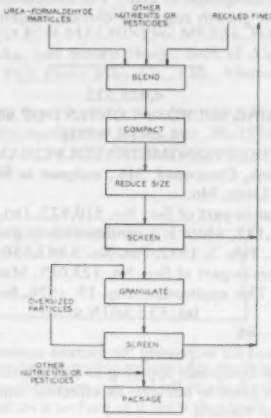
**U.S. Cl. 71—3** **9 Claims**

1. A controlled release particulate fertilizer composition,

said composition comprising particles having a specific gravity greater than 1.40,

each of said particles containing a urea-formaldehyde condensation product as a nitrogen nutrient source in which the molar ratio of urea to formaldehyde in the condensation product is from 1.3:1 to 2.4:1, and at least one additional solid plant nutrient or pesticide trapped with each of said urea-formaldehyde particles,

said particles being substantially uniform from particle to particle in both composition and size, the ratio of the largest to smallest of substantially all said particles being




less than 3:1, and substantially no particles having a size of smaller than 30 mesh,

said composition characterized in that the initial release of nutrient occurs quickly and extends for a period of at least six weeks.

6. The composition of claim 1 which the additional solid material is a fungicide.

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## 4,025,330
## ZINC-CONTAINING FOLIAR SPRAY

**James Benton Storey, College Station, Tex., assignor to Allied Chemical Corporation, Morristown, N.J.**

**Continuation of Ser. No. 553,953, Feb. 28, 1975, abandoned. This application Dec. 22, 1975, Ser. No. 643,205**

**Int. Cl.² C05C** *9/00*

**U.S. Cl. 71—30** **12 Claims**

1. A foliar spray composition consisting essentially of about 0.5 to 4 parts by weight of zinc nitate; 2 to 5 parts by weight of an aqueous fertilizer solution comprising ammonium nitrate and urea, said fertilizer solution containing at least 20 percent by weight of urea and at least 20 percent by weight of ammonium nitrate; and up to about 1,000 parts by weight of water.

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## 4,025,331
## N-[O-(β-CYANOETHYL)-PHOSPHONOMETHYL]-GLYCINES AND DERIVATIVES

**Jean-Pierre Leber, Basel, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland**

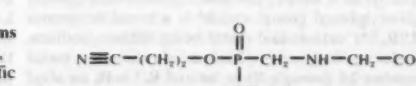
**Filed Oct. 28, 1975, Ser. No. 625,818**

**Claims priority, application Switzerland, Nov. 1, 1974, 14673/74**

**Int. Cl.² A01N** *9/36;* **C07F** *9/40*

**U.S. Cl. 71—86** **17 Claims**

1. A compound of the formula




wherein

R is hydrogen, a hydrocarbon ($C_1$–$C_{12}$) unsubstituted or substituted by halogen, alkoxy ($C_1$–$C_8$), di-alkyl ($C_1$–$C_8$) amino or cyano, or an agriculturally acceptable cation and,

M is hydrogen or an agriculturally acceptable cation.

13. A herbicidal or plant growth regulator composition comprising a herbicidally or plant growth regulating effective amount of a compound of claim 1 in association with a herbicide or plant growth regulator carrier, diluent and/or adjuvant.

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## 4,025,332
## INCREASING SUCROSE CONTENT OF SUGARCANE PLANTS WITH N-PHOSPHONOMETHYLGLYCINAMIDES

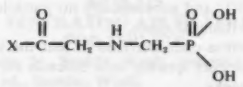
**John E. Franz, Crestwood, Mo., assignor to Monsanto Company, St. Louis, Mo.**

**Continuation-in-part of Ser. No. 510,923, Oct. 1, 1974, Pat. No. 3,988,142, which is a continuation-in-part of Ser. No. 223,351, Feb. 2, 1972, Pat. No. 3,853,530, which is a continuation-in-part of Ser. No. 123,057, March 10, 1971, abandoned. This application Aug. 19, 1976, Ser. No. 715,778**

**Int. Cl.² A01N** *9/36*

**U.S. Cl. 71—86** **14 Claims**

1. A method for increasing the sucrose content of sugarcane plants which comprises applying to said plants, from about 2 to 10 weeks prior to harvest, an effective amount of a compound of the formula



wherein X is morpholino, piperidino, pyrrolidino or NHR, and R is hydrogen, alkyl of 1 to 8 carbon atoms, lower alkenyl, cyclohexyl, hydroxyalkyl of 1 or 2 carbon atoms, or alkoxyalkyl of 3 or 4 carbon atoms.

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## 4,025,333
## SELECTIVELY HERBICIDAL 4,6-DIBROMO-5-HYDROXY-2-PYRIDINE CARBOXAMIDE, SALTS AND ESTERS THEREOF AND METHODS OF PREPARATION AND USE

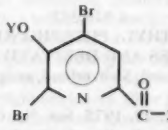
**Alin H. Gulbenk, Walnut Creek, Calif., assignor to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 541,812, Jan. 17, 1975, abandoned. This application Oct. 29, 1975, Ser. No. 626,679**

**Int. Cl.² A01N** *9/22*; **C07D** *213/55*, *213/56*

**U.S. Cl. 71—94** **15 Claims**

1. A compound of the formula



wherein X is -OR or $-NH_2$; Y is H, M or R'CO-; R is a primary or secondary $C_1$–$C_{12}$ alkyl group, a $C_5$–$C_7$ cycloalkyl group, phenyl or a $C_7$–$C_{12}$ phenalkyl or alkylphenyl group; R' is a $C_1$–$C_{12}$ alkyl or alkenyl group, a $C_5$–$C_7$ cycloalkyl or cycloalkenyl group, phenyl or a $C_7$–$C_{12}$ phenalkyl, phenalkenyl, alkylphenyl or alkenylphenyl group; and M is a metal or ammonium ($HNR''R_2'''$)⁺cation, said metal being lithium, sodium, potassium, calcium, magnesium, barium, aluminum, a metal of atomic number 24 through 30 or tin and R'' is H, an alkyl or alkenyl group of 1 to 22 carbons, a hydroxyalkyl group of 2 to 4 carbons, a cycloalkyl group of 3 to 7 carbons or benzyl; and the two R''40 groups, together with the nitrogen, constitute a morpholine or piperidine ring or are independently defined as in R''.

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## 4,025,334
## TUNGSTEN CARBIDE-COBALT FLAME SPRAY POWDER AND METHOD

**Richard Frank Cheney; William Daniel Lafferty, both of Towanda, and George Jacob Long, Wyalusing, all of Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.**

**Filed Apr. 8, 1976, Ser. No. 674,961**

**Int. Cl.² B22F** *1/00*; **C23C** *7/00*

**U.S. Cl. 75—.5 R** **13 Claims**

1. A flame spray powder comprising agglomerates consisting essentially of particles of at least one member selected from a first group consisting of WC, W, and C, and at least one member selected from a second group consisting of Co and an aqueous insoluble chemically reducible cobalt compound, the agglomerate particles held together by a binder consisting essentially of spray dried cobalt nitrate.

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## 4,025,335
## METHOD FOR THE RECOVERY OF USEFUL METALLIC COMPONENTS

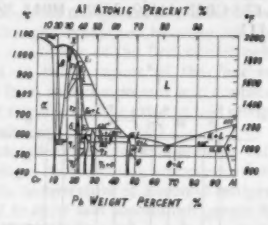
**Toru Morimoto, Ichikawa, and Kenji Matsuzawa, Yokohama, both of Japan, assignors to Nippon Dia Clevite Co., Ltd., Narashino, Japan**

**Filed Nov. 13, 1975, Ser. No. 631,616**

**Claims priority, application Japan, Nov. 20, 1974, 49-133822**

**Int. Cl.² C22C** *1/00*

**U.S. Cl. 75—135** **1 Claim**




1. A method of recovering useful metallic components from a closely layered member comprising the steps of providing a closely layered steel substrate having a surface layer of a copper-aluminum-tin-lead alloy, immersing said layered steel substrate in a crucible containing molten aluminum to dissolve the surface layer and separate said surface layer from the substrate, whereby a lead-tin layer forms at the bottom of the crucible while an aluminum-copper layer forms at the top of the crucible, and separating the aluminum-copper layer from the lead-tin layer.

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## 4,025,336
## ALUMINUM BRONZE HAVING A GOOD WEAR RESISTANCE

**Masateru Suwa, and Noboru Baba, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan**

**Filed May 5, 1976, Ser. No. 683,279**

**Claims priority, application Japan, May 16, 1975, 50-57315**

**Int. Cl.² C22C** *9/01*

**U.S. Cl. 75—162** **13 Claims**

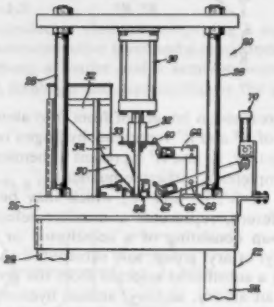
1. An aluminum bronze having a good wear resistance, which comprises 4 to 12% by weight of aluminum, not more than 1% by weight of at least one of solid solution silicon and beryllium, and more than an eutectic composition in the equilibrium phase diagram for quasi-binary Cu-Al alloy phase and iron silicide phase but not more than 10% by weight of iron silicide, the balance being substantially copper.

4,025,337

## CONTINUOUS METHOD OF AND APPARATUS FOR MAKING BARS FROM POWDERED METAL

James Woodburn, Wheaton, and Gordon Russell Lohman, Glen Ellyn, both of Ill., assignors to Amsted Industries Incorporated, Chicago, Ill.

Division of Ser. No. 448,819, March 7, 1974, Pat. No. 3,897,184. This application Mar. 28, 1975, Ser. No. 562,873
Int. Cl.² B22F 3/12
U.S. Cl. 75—214 12 Claims



1. A continuous method of forming a bar from a powdered metal comprising

successively introducing a quantity of powdered metal into a die having a substantially nonexpansible cavity, compacting each quantity of metal powder into bonded segments of a bar of which at least a length of the bar frictionally engages the walls of the die cavity and serves as a stop means against which subsequent quantities of powdered metal are compacted and bonded to form further segments of the bar,

measuring the frictional resisting force of the length of bar in the cavity relative to a predetermined maximum and a predetermined minimum resisting force between which a subsequent quantity of powdered metal is compacted into a segment of predetermined physical characteristics,

controlling the compaction whenever the measured force is greater than the predetermined maximum or less than the predetermined minimum so that the successive quantity of powdered metal is bonded to the bar as a segment having the desired physical characteristics, and

forcing the bar through the die so that at least a length of said bar serves as the stop means.

11. A continuous method of forming a bar comprising introducing a quantity of metal powder into a die cavity having a stop means at one end,

applying a pressure force through a pressure force applying means axially reciprocable in said cavity for compacting the powdered metal against the stop into a segment of a bar of selective physical characteristics and frictionally engagable with the cavity walls so that the bar in the cavity forms a stop means against which subsequent quantities of powdered metal introduced into the cavity may be compacted,

measuring the frictional resisting force of the length of bar in the cavity relative to a predetermined maximum and a predetermined minimum resisting force,

repeatedly introducing a quantity of powdered metal into the cavity,

applying said pressure force after each introduction of a quantity of powdered metal to compact the quantity of metal powders into segments bonded to each other to form a bar which is forced out of the die cavity with at least a length of the bar frictionally engageable with the cavity wall to define the stop,

and controlling the length of travel of the axially reciprocable pressure force applying means whenever the measured force is greater than the predetermined maximum or less than the predetermined minimum such that each quantity of powdered metal introduced in said cavity is compacted into a segment of substantially the same physical characteristics as the remainder of the bar.

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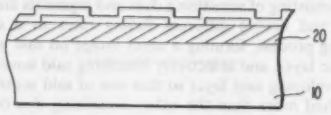
4,025,338

## METHOD FOR MACHINING METAL WORK

Hajime Miyatuka, and Satoru Honjo, both of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Sept. 2, 1975, Ser. No. 609,648
Claims priority, application Japan, Aug. 30, 1974, 49-98886
Int. Cl.² G03G 8/00
U.S. Cl. 96—1 R 6 Claims




1. In an electrophotographic process for machining a metal work comprising forming a marked-off image from an image-forming material on a surface of a recording layer comprising an electrophotographic sensitive layer comprising a photoconductive powder in a binder resin provided on the surface of the metal work and subsequently machining the metal work on the basis of the marked-off image; the improvement comprising applying a protective resin layer over the image-bearing surface of the metal work prior to any metal machining, the resin layer comprising a mixture of nitrocellulose and a methacrylic polymer in a weight ratio ranging from about 80:20 to 40:60 of the nitrocellulose to the methacrylic polymer and not hindering the visibility of the image, and the methacrylic polymer mainly comprising methylmethacrylate, wherein the degree of copolymerization of any other component with methyl methacrylate is up to about 20%, and having a glass transition temperature of about 85° C. to 115° C., wherein said protective resin layer has a thickness ranging from about 2 to 30 microns, on a dry basis.

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4,025,339

## ELECTROPHOTOGRAPHIC FILM, METHOD OF MAKING THE SAME AND PHOTOCONDUCTIVE COATING USED THEREWITH

Manfred R. Kuehnle, Lexington, Mass., assignor to Coulter Information Systems, Inc., Bedford, Mass.

Continuation of Ser. No. 434,699, Jan. 18, 1974, abandoned, and a continuation-in-part of Ser. No. 378,180, July 11, 1973, abandoned, which is a continuation-in-part of Ser. No. 323,132, Jan. 12, 1973, abandoned, which is a continuation-in-part of Ser. No. 260,848, June 8, 1972, abandoned. This application July 13, 1976, Ser. No. 704,780
Int. Cl.² G03G 5/04; C23C 15/00
U.S. Cl. 96—1.5 88 Claims

1. In an electrophotographic article in which substrate means carry thin film coatings at least one of which is a thin film coating of a photoconductive material less than 1 micron in thickness, means contiguous to the coating to facilitate uniform charging thereof before exposure; the invention comprising, said coating being very dense, wholly inorganic, microcrystalline, the crystals of said coating being generally uniformly oriented vertically relative to the surface of the substrate means, substantially free of effective barrier layers between the crystals, the coating having light transmissivity of at least 70 percent, having a dark resistivity of at least $10^{12}$ ohm-centimeters and a ratio between dark and light resistivity of at least about $10^4$ and being electrically anisotropic

whereby said coating is capable of accepting a rapid charge and retaining same sufficient to enable toning.

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**4,025,340**

## PROCESS FOR TONING ELECTROPHOTOGRAPHIC PHOTOSENSITIVE MATERIAL

**Masaaki Takimoto, and Satoru Honjo, both of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Nov. 10, 1971, Ser. No. 197,493**

**The portion of the term of this patent subsequent to Feb. 18, 1992, has been disclaimed.**

**Int. Cl.² G03G 5/09**

**U.S. Cl. 96—1.6** **7 Claims**

**1.** A process for toning an electrophotographic layer comprising a photoconductive powdered material and a resinous binder which comprises adding at least two coloring materials to said layer, said coloring materials being selected from the group consisting of sensitizing dyes and pigments and mixtures thereof and having different fading rates in a succeeding bleaching process, forming a toner image on said electrophotographic layer, and selectively bleaching said sensitizing dyes after developing said layer so that one of said sensitizing dyes is bleached more than the other sensitizing dye or pigment, said other sensitizing dye or pigment being subjected to no further bleaching treatment to thereby tone said layer, said bleaching being conducted by applying a transparent lacquer containing at least 0.1 grams/meter² of a peroxide.

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**4,025,341**

## PHOTOCONDUCTIVE POLYMER AND PHOTOCONDUCTIVE COMPOSITIONS AND ELEMENTS CONTAINING SAME

**Norman G. Rule, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Dec. 20, 1974, Ser. No. 534,980**

**Int. Cl.² G03G 5/09**

**U.S. Cl. 96—1.6** **20 Claims**

**1.** In a photoconductive insulating element comprising:

a. a conductive support,

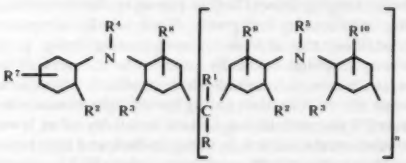
b. a charge-generation layer coated on said support and

c. a charge-transport layer in electrical contact with said charge-generation layer,

i. said charge-generation layer having a thickness of about 0.1 to about 15 microns comprising a continuous, electrically insulating, polymer phase and dispersed in said continuous phase a discontinuous phase comprising a finely divided, particulate, co-crystalline complex of (1) at least one polymer having an alkylidene diarylene group in a recurring unit and (2) at least one pyrylium-type dye salt, said co-crystalline complex, upon exposure to activating radiation for said complex, capable of generating and injecting charge carriers into said charge-transport layer, and

ii. said charge-transport layer comprising an organic composition in electrical contact with said charge-transport layer, said organic composition comprising as a p-type, charge-transport material an organic photoconductive material capable of accepting and transporting injected charge carriers from said charge-generation layer,

the improvement wherein said p-type, charge-transport material is a photoconductive polymer having the formula:



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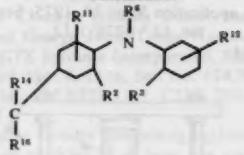


wherein:

*n* represents an integer of from 0 to about 20;

each of $R^2$ and $R^3$ represents hydrogen or, when taken together, $R^2$ and $R^3$ represent a chemical bond which completes a carbazole nucleus;

Each of $R^4$, $R^5$ and $R^6$, which may be the same or different, represents a member selected from the group consisting of a substituted or unsubstituted alkyl or aryl group, said substituted alkyl group having a substituent selected from the group consisting of an alkoxy, aryloxy, amino, hydroxy, alkylamino, aryl arylamino, nitro, cyano or a halogen group, said substituted aryl group having a substituent selected from the group consisting of an alkoxy, aryloxy, amino, hydroxy, alkylamino, arylamino, nitro, cyano, halogen or alkyl group;

each of $R^7$, $R^8$, $R^9$, $R^{10}$, $R^{11}$ and $R^{12}$, which may be the same or different, represents a member selected from the group consisting of hydrogen, the substituted and unsubstituted alkyl and aryl groups as defined for $R^4$, $R^5$ and $R^6$, an alkoxy group, aryloxy group, halogen, nitro group, cyano group, amino group or an acyl group;

each of $R^1$ and $R^{14}$, which may be the same or different, represents a member selected from the group consisting of hydrogen and the substituted and unsubstituted alkyl and aryl groups defined for $R^4$, $R^5$ and $R^6$; and

each of R and $R^{16}$, which may be the same or different, represents a member selected from the substituted and unsubstituted alkyl and aryl groups defined for $R^4$, $R^5$ and $R^6$;

with the proviso that, when taken together, $R^1$ and R or $R^{14}$ and $R^{16}$ represent the carbon atoms necessary to complete a cycloalkyl group containing 3 to about 21 carbon atoms in the cycloalkyl ring.

**5.** A photoconductor insulating composition comprising a condensation polymer of (a) a tertiary amine having at least 2 phenyl groups bonded to the amine atom, (b) an amount of sensitizer effective to sensitize said composition and (c) a carbonyl-containing compound having the formula:

wherein

$R^1$ represents a member selected from the group consisting of hydrogen, alkyl group or an aryl group;

R represents an alkyl or aryl group; and

$R^1$ and R, when taken together, represent the carbon atoms necessary to complete a cycloalkyl group containing 4 to about 8 carbon atoms in the cycloalkyl ring.

## 4,025,342
## ORGANIC SEMICONDUCTORS USED IN PHOTOCONDUCTOR ELEMENT

**Donald J. Trevoy, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Division of Ser. No. 482,960, June 25, 1974, Pat. No. 3,963,498, which is a continuation-in-part of Ser. No. 212,640, Dec. 27, 1971, abandoned, and Ser. No. 455,705, March 28, 1974, abandoned. This application Feb. 2, 1976, Ser. No. 654,440**

**Int. Cl.² G03G** *5/04*

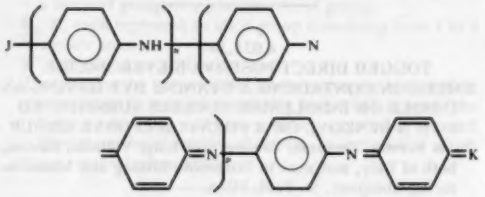
**U.S. Cl. 96—1.5** **5 Claims**

1. A semiconductor element comprising a support having thereon a photoconductive layer and a semiconductor composition comprising a binder and a semiconductor having organic solvent solubility and represented by the expression:

$$D[A]_q$$

wherein:

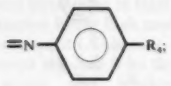
D represents a moiety having the structure:



in which

J represents either $R_1$ or a group having the formula

K represents either $R_3$ or a group having the formula



$R_1$ and $R_4$ are each selected from the group consisting of a hydrogen atom, a hydroxy radical, a lower alkyl radical, a lower alkoxy radical, an amino radical, an aryl radical, an acyl radical, a carboxylate radical, a thio radical, a nitrate radical, a sulfonate radical, a halogen atom and a cyano radical;

$R_2$ and $R_3$ each represent (1) an uncharged radical selected from the group consisting of oxo, imino and thioxo radicals or (2) a charged radical selected from the group consisting of alkoxonium, iminium, and sulfonium radicals; and

*n* and *p* are each integers having the following combination of values:

| | |
|---|---|
| when J represents  | |
| and K represents $R_3$, | p=0, n=0,1,2,3,4,5<br>p=1 n=0,1,2,3<br>p=2 n=0,1 |
| when J represents $R_1$ and K represents $R_3$, | p=0 n=0,1,2,3,4,5,6<br>p=1 n=0,1,2,3,4<br>p=2 n=0,1,2<br>p=3 n=0 |

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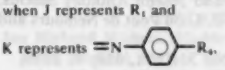
| | |
|---|---|
| when J represents $R_1$ and K represents  | p=0 n=0,1,2,3,4,5<br>p=1 n=0,1,2,3<br>p=2 n=0,1 |

A is an acid when $R_2$ and $R_3$ are each an uncharged radical and when $R_2$ and $R_3$ is a charged radical, A is an anion derived from an acid; and

*q* represents the number of A moieties associated with each D is a positive integer that is greater than 0 and less than or equal to the number of amine groups in the D moiety.

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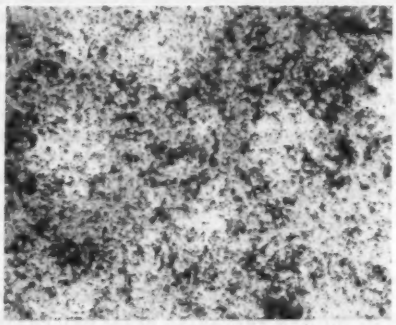
## 4,025,343
## IMAGE RECEIVING ELEMENTS COMPRISING STANNIC OXIDE POLYMERS HAVING NOBLE METALS REDUCED THEREON

**Boris Levy, Wayland, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Filed Jan. 14, 1976, Ser. No. 649,202**

**Int. Cl.² G03C** *7/00, 5/54, 1/48, 1/84*

**U.S. Cl. 96—3** **23 Claims**



23. A photographic process which comprises, in combination, the steps of:

a. exposing to incident actinic radiation a photographic film unit comprising, in order, a transparent support carrying an additive multicolor screen comprising red, green and blue optical filter elements in a screen pattern, a silver precipitating layer, a substantially processing composition permeable polymeric layer, a layer comprising photosensitive silver halide, said silver precipitating layer comprising an inorganic stannic oxide polymer hydrosol having a noble metal reduced thereon said inorganic stannic oxide polymer comprising stannic oxide monomeric units and metallic oxide monomeric units of a metal having a valence of +2 or +3; and

b. contacting the exposed element with a processing composition comprising a silver halide solvent and a silver halide developing agent to thereby provide to the element a silver transfer image in terms of the unexposed areas of said silver halide layer, as a function of the point-to-point degree of exposure thereof; said silver transfer image being viewable without separation of said silver precipitating layer and said silver halide layer.

## 4,025,344
## LITHOGRAPHIC DEVELOPER REPLENISHMENT PROCESS

Charles Anthony Allen, Idaho Falls, Idaho; Thomas Albert Bailey, III, Wilmington, Del., and Joseph Anthony Sincius, Little Silver, N.J., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 358,671, May 9, 1973, abandoned, which is a continuation-in-part of Ser. No. 285,126, Aug. 31, 1972, abandoned. This application May 23, 1975, Ser. No. 580,193

Int. Cl.² G03C *5/26, 5/24, 5/30*

U.S. Cl. 96—50 A 8 Claims

1. In a process of developing imagewise-exposed lithographic film in a bath of lith developer solution contained in an automatic photographic film processor,

said solution containing hydroquinone as the sole developing agent and having a low sulfite ion concentration characterized by a high sensitivity to pH, to bromide ion, and to sulfite concentration changes, and being subject to aging due to aerial oxidation and anaerobic degradation, and wherein pH and concentrations of hydroquinone and bromide ion are changed by the development process and wherein quantities of premixed replenishers are added to said bath to compensate for concentration changes due to development and to aging,

the improvement comprising: replenishing said bath of lith developer solution to compensate for concentration changes due to development by repetitively adding to the developer solution as each quantity of film is developed, in combination:

1. a quantity of a stable solution concentrate A having a pH below 8 and consisting essentially of an aqueous solution of sufficient hydroquinone to replace that consumed during development of each quantity of film,
2. a quantity of stable solution concentrate B consisting essentially of a strongly basic aqueous solution having a pH above 9, and free of developing agent, the amount of concentrate B being sufficient to maintain the pH and constituent concentration of the developer; and

wherein A, B, or A+B contains sodium formaldehyde bisulfite in an amount sufficient to act as a buffer for sulfite ion concentration.

## 4,025,345
## METHOD OF PREPARING BLEACHED PHASE HOLOGRAM AND A BLEACHING SOLUTION COMPOSITION THEREFOR

Keishiro Kido, and Noboru Arai, both of Asaki, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Aug. 25, 1975, Ser. No. 607,520

Claims priority, application Japan, Aug. 23, 1974, 49-97444

Int. Cl.² G03C *5/32, 5/04*

U.S. Cl. 96—60 R 6 Claims

1. A method of preparing a bleached phase hologram comprising bleaching a silver image of an amplitude hologram formed in a silver halide photographic material by exposure of said material to an interference beam formed by superimposing an object laser beam with a reference laser beam to form said hologram and forming said silver image using conventional photographic processing, with a bleaching solution comprising a liquid medium containing iodine and comprising water and an organic liquid, said water serving to swell said colloid, said organic liquid serving to dissolve said iodine and to prevent said colloid from excessively swelling so that the gelatin and/or modified gelatin hydrophilic colloid of the silver photographic swells to an extent of from about 150 to 400%, so as to bleach said silver image by the reaction of said iodine with said silver.

## 4,025,346
## PLATES COMPRISING A PHOTOPOLYMERIZABLE COMPOSITION COATED ON A SUBSTRATE

Frederick Edward Petke, Cincinnati; John Nicholas Kirch, Blue Ash, both of Ohio, and Michael Edward Gerkin, Florence, Ky., assignors to Borden, Inc., Columbus, Ohio

Filed Dec. 31, 1975, Ser. No. 645,481

Int. Cl.² G03C *1/94, 1/68;* C08F *8/00*

U.S. Cl. 96—86 P 13 Claims

1. A plate comprising a substrate and a photopolymerizable coating composition disposed thereon, the coating composition includes the following components dispersed in an inert organic solvent:

a. 20 to 50%, by weight of (a), (b) and (c), of a saturated and halogenated polyester containing one phenyl group;
b. 10 to 45%, by weight of (a), (b) and (c), of an organic polyacrylate;
c. 5 to 15%, by weight of (a), (b) and (c), of a metal acrylate; and
d. an effective amount of an organic photoinitiator to initiate cross-linking in response to actinic light.

## 4,025,347
## TOGGED DIRECT-POSITIVE SILVER HALIDE EMULSION CONTAINING A CYANINE DYE HAVING AN INDOLE OR INDOLENINE NUCLEUS SUBSTITUTED WITH A BENZOYL OR A PHENYLSULFONYL GROUP

Paolo Beretta, Ferrania, Savona, and Luigi Valbusa, Savona, both of Italy, assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

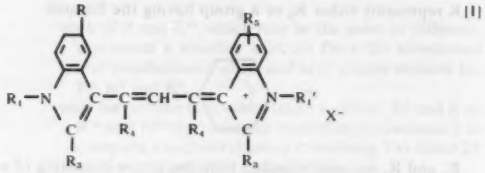
Filed June 12, 1974, Ser. No. 478,710

Claims priority, application Italy, June 18, 1973, 50882/73

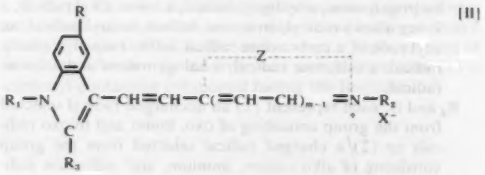
Int. Cl.² G03C *1/36, 1/28*

U.S. Cl. 96—101 6 Claims

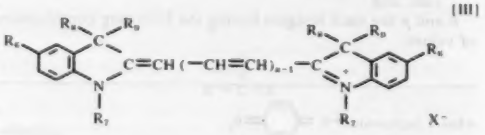
1. A light-sensitive, fogged direct positive silver halide emulsion characterized in that it contains a sensitizing amount of cyanine dye corresponding to one of the following formulae:



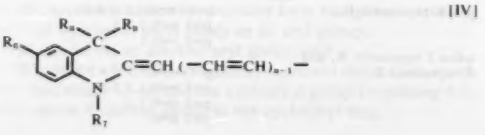
[I]



[II]

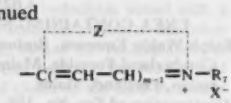


[III]



[IV]

-continued



wherein:

*m* represents a positive integer of from 1 to 2;

*n* represents a positive integer of from 2 to 4;

$R$, $R_6$ each represent a benzoyl group or a phenylsulfonyl group;

$R_1$, $R_1'$,

$R_2$ and $R_7$ each represent a substituted or non-substituted acyclic hydrocarbon substituent; an alkyl-aryl substituent or an aryl substituent;

$R_3$ represents an aryl or substituted aryl group;

$R_4$ represents an hydrogen atom, an alkyl group having from 1 to 4 carbon atoms, an aryl group, a thienyl group, with the proviso that at least one of the two substituents $R_4$ is an hydrogen atom;

$R_5$ represents an hydrogen atom, an alkyl group, an alkoxy group, an aryloxy group, an halogen atom, a nitro group, a benzoyl group or a phenylsulfonyl group;

$R_8$, $R_9$ each represent an alkyl group containing from 1 to 4 carbon atoms;

$X^-$ represents an acid anion; and

Z represents the non-metallic atoms necessary to complete a heterocyclic nucleus containing from 5 to 6 atoms in the heterocyclic ring, said non-metallic atoms being selected from the group consisting of carbon, oxygen, sulfur, nitrogen, and selenium atoms.

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**4,025,348**

## PHOTOSENSITIVE RESIN COMPOSITIONS

**Katsushige Tsukada; Asao Isobe; Toshiaki Ishimaru; Nobuyuki Hayashi, and Masahiro Abo, all of Hitachi, Japan, assignors to Hitachi Chemical Company, Ltd., Japan**

**Filed May 5, 1975, Ser. No. 574,452**

**Claims priority, application Japan, May 10, 1974, 49-51111; May 10, 1974, 49-51112; May 10, 1974, 49-51113**

**Int. Cl.² G03C *1/68*; G08F *8/00*; G08L *61/06***

**U.S. Cl. 96—115 R** **20 Claims**

1. A photosensitive resin composition which consists essentially of the following components: (A) a photopolymerizable unsaturated compound containing at least two terminal ethylene groups, (B) a reactive linear high molecular weight compound other than component (A) having in its side chain one or two functional groups selected from the class consisting of tetrahydrofurfuryl group and N-alkoxymethylcarbamoyl group, (C) a sensitizer capable of initiating polymerization of the unsaturated compound upon irradiation with active rays, (D) a compound other than components (A) and (B) having at least two epoxy groups, and (E) a latent curing agent for epoxy resins.

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**4,025,349**

## SILVER HALIDE PHOTOGRAPHIC ELEMENTS SPECTRALLY SENSITIZED WITH AN ACETYLENIC ANALOG OF CYANINE OR MEROCYANINE DYES

**John David Mee, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Continuation-in-part of Ser. No. 452,301, March 18, 1974, abandoned, which is a division of Ser. No. 375,974, July 2, 1973, abandoned. This application Mar. 5, 1975, Ser. No. 555,505**

**Int. Cl.² G03C *1/02*, *1/10***

**U.S. Cl. 96—120** **11 Claims**

1. A light-sensitive photographic silver halide emulsion spectrally sensitized with a methyne dye, said methyne dye comprising two auxochromic groups of the type used in cyanine or merocyanine dyes linked by a carbon atom chain in which each of said carbon atoms has an unsaturated linkage to at least one adjacent carbon atom in said chain and two of said carbon atoms are joined by a triple bond or said chain includes three consecutive carbon to carbon double bonds.

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**4,025,350**

## GELLABLE BINDERS

**Ian Richard Walters, Huddersfield, and Harold Garton Emblem, Mirfield, both of England, assignors to Zirconal Processes Limited, Bromley, England**

**Filed Mar. 24, 1975, Ser. No. 561,347**

**Claims priority, application United Kingdom, Aug. 13, 1974, 35610/74; Mar. 28, 1974, 13834/74**

**Int. Cl.² B28B *7/34***

**U.S. Cl. 106—38.35** **7 Claims**

1. A method of making a refractory article comprising:

a. preparing a liquid, flowable slurry by combining a refractory powder, an aqueous solution of a zirconium salt which when dissolved in water yields an aqueous solution that is acidic, a gellation-inducing agent, and a gellation-delaying agent; said gellation-inducing agent being selected from the group consisting of aminoalcohols, morpholine, dead burned magnesia powder and powdered magnesia-containing spinels and said gellation-delaying agent being selected from the group consisting of magnesium acetate, magnesium lactate, ammonium lactate, glycine, betaine, fructose and polyhydric alcohols; the amounts of refractory powder, solution of zirconium, salt, gellation-inducing agent and gellation-delaying agent being such that the slurry will set to a coherent state upon standing;

b. pouring the slurry while liquid into a mold;

c. allowing the slurry in the mold to set to form a coherent green shape; and

d. removing the green shape from the mold, drying the green shape and firing the dried green shape to form a sintered refractory article.

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**4,025,351**

## SINTERED SILICON NITRIDE BASE CERAMIC AND SAID CERAMIC

**Hideyuki Masaki, Nagoya, Japan, assignor to Kabushiki Kaisha Toyota Chuo Kenkyusho, Nagoya, Japan**

**Division of Ser. No. 408,358, Oct. 23, 1973, Pat. No. 3,950,464. This application Nov. 18, 1975, Ser. No. 632,944**

**Claims priority, application Japan, Oct. 24, 1972, 47-106817**

**Int. Cl.² C04B *35/12*, *35/20*, *35/42***

**U.S. Cl. 106—59** **4 Claims**

1. A silicon nitride-based ceramic consisting essentially of 60 to 90 mol % of $Si_3N_4$ and 8 to 40 mol % of a composition consisting of at least one member of a first group consisting of MgO, ZnO and NiO and at least one member of a second group consisting of $Al_2O_3$, $Cr_2O_3$, $Y_2O_3$, $TiO_2$ and $SnO_2$, the mol ratio of said member or members of said first group to said member or members of said second group being in the range from 1:9 to 9:1.

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**4,025,352**

## MANUFACTURE OF SULFUR CONCRETE

**Bernd Leutner, Maxdorf, and Lothar Diehl, Ludwigshafen, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany**

**Filed Dec. 16, 1975, Ser. No. 641,355**

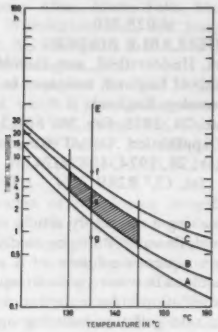
**Claims priority, application Germany, Dec. 24, 1974, 2461483; July 31, 1975, 2534230**

**Int. Cl.² C04B *33/04***

**U.S. Cl. 106—70** **8 Claims**

1. A process for the manufacture of sulfur concrete by mixing a binder of molten sulfur and dicyclopentadiene with aggregate and cooling the resulting mixture, wherein sulfur, dicyclopentadiene and the aggregate are mixed at from 120° to 160° C, and the period for which the sulfur and dicyclopen-

tadiene interact, at the particular temperature, is chosen so that it lies on a straight line, parallel to the ordinate of FIG. 1,




which intersects the abscissa at the particular temperature and is within the limits of the points of intersection of the straight line with the curves A and D.

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**4,025,353**

## VISCOSE SOLUTIONS AND PROCESS FOR PREPARING THE SAME

**Svante Ludvig Wahlen, Stenungsund, Sweden, assignor to Berol Kemi AB, Stenungsund, Sweden**

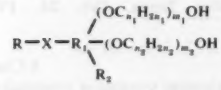
**Filed Sept. 22, 1975, Ser. No. 615,648**

**Claims priority, application Sweden, Sept. 23, 1974, 7411920**

**Int. Cl.² C08L *1/24***

**U.S. Cl. 106—165** **24 Claims**

1. A viscose solution having improved processability, comprising cellulose in aqueous alkaline solution and an amount within the range from about 0.2 to about 40 g/kg cellulose of a nonionic nitrogen-free surface active compound having the general formula:

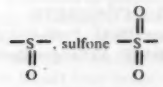


wherein:

R is a monovalent hydrocarbon group having at least six carbon atoms up to about 50 carbon atoms;

$R_1$ is a tetravalent hydrocarbon group having from one to about six carbon atoms;

X is a bivalent group selected from the group consisting of methylene, thioether—S—, oxyether—O—, sulfoxide,



and oxyalkylene $-(OC_nH_{2n})_mO-$, wherein $n$ is 2, 3, or 4; and

$m$ is the number of oxyalkylene units and is within the range from 1 to about 30;

$R_2$ is hydrogen or an oxyalkylene group $-(OC_{n_3}H_{2n-3})_{m_3}OH$;

$n_1$, $n_2$, $n_3$ are 2, 3, or 4; and

$m_1$, $m_2$, $m_3$ represent the number of oxyalkylene units, and are within the range from 1 to about 30.

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**4,025,354**

## UREA CONTAINING SIZING COMPOSITIONS

**Ralph Waldo Emerson, Boston, Mass., and John R. Shattuck, Cumberland Foreside, Maine, assignors to Plasmine Corporation, Portland, Maine**

**Continuation of Ser. No. 358,296, May 8, 1973, abandoned. This application Jan. 30, 1975, Ser. No. 545,537**

**Int. Cl.² C08L *93/04***

**U.S. Cl. 106—218** **58 Claims**

1. A sizing agent comprising an aqueous mixture of a component selected from the group consisting of rosin, hydrocarbon resins, stearic acid, wax and their mixtures, and the reaction product of a mixture of urea and sulfamic acid wherein the sulfamic acid has been combined with the urea in an amount sufficient to produce an acidity of said reaction product of at least 1,000 parts per million and wherein said reaction product has a pH of at least 7.

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**4,025,355**

## PROCESS FOR THE PREPARATION OF STARTING MIXTURE FOR MAKING CONSTRUCTION ELEMENTS

**Vasily Pavlovich Mozhaev, ulitsa Shvernika, 1, korpus 4, kv. 38; Ilya Yakovlevich Leichenko, ulitsa Televidenia, 19, korpus 3, kv. 160, both of Moscow; Oleg Yakovlevich Gerasimov, ulitsa Gorkogo, 10a, kv. 46, Kalinin; Semen Grigorievich Lyandres, ulitsa Vokzalnaya, 5, kv. 4, Kalinin; Jury Borisovich Zuev, prospekt Pobedy, 74, kv. 7, Kalinin; Boris Alexandrovich Evdokimov, ulitsa Gvardeiskaya, 10a, kv. 66, Kalinin, and July Alexandrovich Matveev, prospekt Pobedy, 74, kv. 35, Kalinin, all of U.S.S.R.**

**Filed Dec. 24, 1975, Ser. No. 643,944**

**Claims priority, application U.S.S.R., Dec. 30, 1974, 2090351**

**Int. Cl.² C04B *31/18*; C09C *1/62***

**U.S. Cl. 106—290** **4 Claims**

1. The process for the preparation of starting concentrate mixture of pigments and/or blowing agent used in the manufacture of construction elements which comprises the steps of a) suspending said pigments and/or blowing agents in aqueous media containing surfactants,

b. introducing into said suspension a plurality of ferromagnetic bodies

c. subjecting said suspension containing said bodies to a rotating electromagnetic field to effect wetting and uniform distribution of said pigments and/or blowing agent in said resultant starting concentrate mixtures for incorporation in mixes for construction elements.

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**4,025,356**

## METHOD FOR CONTINUOUS HYDROLYSIS OF PENTOSE CONTAINING MATERIAL AND APPARATUS FOR IMPLEMENTING THE METHOD

**Gustaf Arthur Nyman, Tuomarila, Finland, and Göte Slivö, Stockholm, Sweden, assignors to Anstalt Gemass, Vaduz, Liechtenstein**

**Filed Jan. 13, 1975, Ser. No. 540,685**

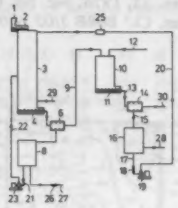
**Claims priority, application Sweden, Jan. 16, 1974, 7400547**

**Int. Cl.² A23K *1/12*; C13K *1/02, 13/00*; D21C *7/00***

**U.S. Cl. 127—1** **9 Claims**

9. Apparatus for the continuous hydrolysis of pentosan-containing material at a temperature between 60° and 120° C and

at a pH lower than 5 comprising a hydrolysis vessel with a feed-in means at one end and a feed-out means at the other end and a drain for hydrolysate, means for recirculation of concentrated hydrolysate at a point between the feed-in and feed-out of the raw material, and closer to the feed-in, means for returning of weaker hydrolysate, washing fluid, at a point



immediately adjacent to the feed-in of the raw material in concurrent operation and immediately adjacent to the feed-out in countercurrent operation, wherein the feed-out means has been constructed so that the hydrolysis fluid is prevented from flowing out by a continuous plug formation from the hydrolyzed, solid matter.

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**4,025,357**

## ION EXCHANGE ENRICHMENT OF IMPURE DEXTROSE SOLUTIONS

**Roger S. Leiser; Gin Chain Liaw, and Charles E. Schollmeier, all of Decatur, Ill., assignors to A. E. Staley Manufacturing Company, Decatur, Ill.**

**Filed Apr. 14, 1975, Ser. No. 568,067**
**Int. Cl.² C13K** *1/00, 1/08, 3/00*
**U.S. Cl. 127—46 A** **12 Claims**

1. A method for treating a mother liquor from a dextrose crystallization process and recovering a dextrose-rich portion from the treated mother liquor said method comprising:

a. transferring a mother liquor through a bed of an adsorption agent having a $K_M/K_D$ of at least about 1.5 when dextrose is to be preferentially adsorbed by the bed and a $K_D/K_M$ of at least about 4 when oligosaccharides are to be preferentially adsorbed by the bed,

b. preferentially adsorbing either the dextrose or the oligosaccharides of the mother liquor in said bed,

c. eluting either the adsorbed dextrose or the adsorbed oligosaccharides from said bed with a solvent; and

d. recovering a dextrose-rich portion of said mother liquor from the eluted solvent when the dextrose has been preferentially adsorbed by the bed or from the dextrose-rich portion which has passed through the bed when the oligosaccharides are preferentially adsorbed by said bed.

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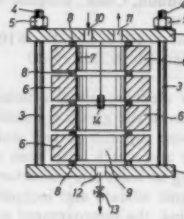
**4,025,358**

## PROCESS FOR CURRENTLESS SEPARATION OF A NICKEL LAYER FROM OBJECTS OF LIGHT METAL

**Albert Kossler, Bad Wimpfen, Germany, assignor to Audi NSU Auto Union Aktiengesellschaft, Neckarsulm, Wurtt, Germany**

**Filed Oct. 1, 1975, Ser. No. 618,558**
**Claims priority, application Germany, Oct. 11, 1974, 2448526**
**Int. Cl.² B08B** *3/08*
**U.S. Cl. 134—3** **2 Claims**

1. Process for currentless separation of a nickel layer from the inner surfaces of ring-shaped objects of light metal comprising: stacking the objects one on another with interposition of annular packings between adjacent stacked objects and clamping the objects together to form a sealed interior chamber, introducing into the chamber a bath containing nitric acid, water at 70° to 80° C and metallic copper in amounts effective to dissolve the nickel layer with the nitric acid reacting with the nickel and the copper, the reaction gases escaping



from the chamber and the bath being discharged from the chamber upon termination of the reaction.

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**4,025,359**

## INHIBITED ACID COMPOSITION FOR CLEANING WATER SYSTEMS

**George F. Connelly, Jr., Golf Road & Perkins Blvd., Grand Beach, Mich. 49117**

**Continuation-in-part of Ser. No. 456,468, Jan. 1, 1974, Pat. No. 3,969,255. This application July 3, 1975, Ser. No. 593,037**
**Int. Cl.² B08B** *3/08*
**U.S. Cl. 134—3** **13 Claims**

7. A method of removing a scale deposit from galvanized or steel surfaces normally in contact with water, which deposit includes at least one of alkaline earth metal carbonate, which method comprises contacting said scale deposit with an aqueous composition containing from about 7.5 to 25 parts by weight of hydrochloric acid, and a combination of inhibitors consisting essentially of about 0.6 to 2.6 parts by weight of furfural, and about 0.5 to 1.4 parts by weight of dialkylthiourea, whereby said deposit is dissolved and/or dispersed.

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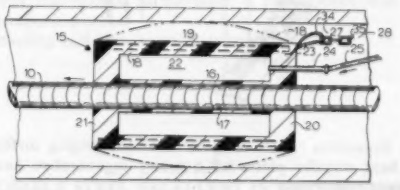
**4,025,360**

## METHOD AND APPARATUS FOR INJECTING FOAM INTO A PIPELINE, INCLUDING AN INFLATABLE PLUG

**Frederick F. Horne, Carmel Valley, and Gerald G. Vanderlans, Lodi, both of Calif., assignors to Airrigation Engineering Company, Inc., Carmel Valley, Calif.**

**Filed Mar. 4, 1976, Ser. No. 664,049**
**Int. Cl.² B08B** *9/02*
**U.S. Cl. 134—24** **6 Claims**



3. A method for treating a section of pipeline with foam sent through a tube, comprising:

blocking the pipeline at the upstream end of said section by inflating an inflatable plug,

adjusting the tube, by sliding it through said plug, to have an outlet at a desired distance from the blocked end, and

producing foam and delivering it under pressure to the inlet of the foam-conducting tube,

the foam tending to flow into said pipeline from said outlet first in the direction away from said tube inlet, and then, as pressure builds up in said pipeline to flow back around and along said tube.

## 4,025,361
## REMOVAL OF CERAMIC INVESTMENT SHELL MOLD FROM METAL CASTING

Joseph G. Lucas, Trumbull, Conn., assignor to Avco Corporation, Stratford, Conn.

Filed Sept. 4, 1975, Ser. No. 610,494
Int. Cl.² B22D 29/00
U.S. Cl. 134—28 6 Claims

1. In a process for cleaning metal articles consisting of a metal alloy selected from the group consisting of nickel-base superalloys, cobalt base superalloys and stainless steels containing up to 35% Cr and which have been cast in a ceramic shell mold comprising at least one refractory oxide material bonded by an inorganic silicate and including a nucleant as part of the face coating, the improvement which comprises:

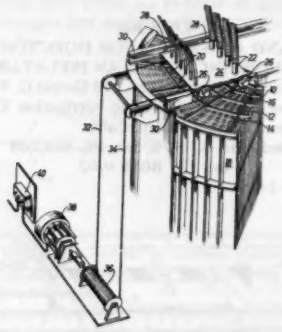
immersing the cast metal article, while at least partially embedded in the ceramic shell mold, in a concentrated solution of HF for a time sufficient to effect at least partial disintegration of said shell mold by the dissolving action of said HF solution on said inorganic silicate binder, thereby facilitating partial removal of said ceramic shell mold from said cast metal article; and

thereafter immersing the article in a solution of HF and $HNO_3$ in water to dissolve said nucleant and complete the removal of said ceramic shell.

## 4,025,362
## APPARATUS FOR CLEANING THE HEAT EXCHANGING SURFACES OF THE HEAT TRANSFER PLATES OF ROTARY REGENERATIVE HEAT EXCHANGERS

Martin Frauenfeld, Heidelberg, Germany, assignor to Svenska Rotor Maskiner Aktiebolag, Nacka, Sweden

Filed Mar. 31, 1976, Ser. No. 672,427
Claims priority, application Germany, Apr. 1, 1975, 2514173
Int. Cl.² B08B 3/02, 9/00
U.S. Cl. 134—57 R 13 Claims



1. Apparatus for cleaning the heat exchanging surfaces of the heat transfer plates of a rotary regenerative heat exchanger comprising:

a plurality of cleaning fluid nozzles (20) directed towards the heat transfer plates, said nozzles (20) being positioned adjacent each other on at least one line and essentially in parallel to the planes of the heat transfer plates;

means for displacing said nozzles (20) relative to the planes of said plates;

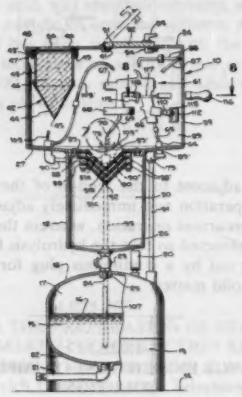
said nozzles (20) each being dimensioned to produce a directional output jet of high kinetic energy and with a sectional area that at least perpendicular to the planes of said heat transfer plates essentially does not increase in size; and

a cleaning liquid source coupled to said nozzles (20) for supplying said cleaning fluid nozzles (20) sequentially in groups of at least one nozzle with a high pressure cleaning liquid.

## 4,025,363
## SPRAY EQUIPMENT CLEANER

Benito De Santis, 2601 W. Olive St., Burbank, Calif. 91505

Filed Jan. 12, 1976, Ser. No. 648,278
Int. Cl.² B08B 3/02, 9/00
U.S. Cl. 134—102 14 Claims



1. A compact cleaning device for spray paint equipment including spray guns and paint cups comprising a tank providing a sealed reservoir for cleaning solvent with a pressure chamber for air above the solvent and including a base at a bottom wall of said tank serving as a support for the device, a collecting receptacle having bottom and side wall portions forming a collecting chamber, and a cabinet comprising bottom, top, and side wall portions providing a closed cleaning chamber having therein a spray gun station and a paint cup station, the bottom wall portion of said cabinet being mounted on and substantially supported by the side wall portion of said collcting receptacle, a return pipe interconnecting the bottom wall portion of the receptacle with the top of the tank, said pipe serving as a support for said receptacle and said cabinent on said tank, and a fluid supply system comprising interconnected pipes and a supply line for air under pressure to said system, said system comprising an air supply valve, a first air pipe line from said valve to said reservoir, a first solvent pipe line from said reservoir to said spray gun station and a second solvent pipe line from said reservoir to said cup station and outflow means for solvent from said cabinet to said tank, said outflow means comprising an open passage through said bottom wall portion of the cabinet to said receptacle and having filter means therein.

## 4,025,364
## PROCESS FOR SIMULTANEOUSLY FABRICATING EPITAXIAL RESISTORS, BASE RESISTORS, AND VERTICAL TRANSISTOR BASES

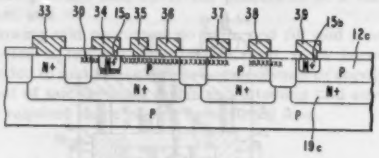
Peter R. Smith, San Jose, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Filed Aug. 11, 1975, Ser. No. 603,402
Int. Cl.² H01L 21/265
U.S. Cl. 148—1.5 5 Claims

1. In the fabrication of semiconductor integrated circuits, the process of accurately defining base and emitter regions of bipolar transistors and eptiaxial resistors with a minimum of process steps comprising

a. forming an epitaxial layer on a semiconductor substrate:

b. forming upon selected regions of the surface of said epitaxial layer a layer of a first material with openings through said first layer where transistor emitters are to be formed;
c. forming upon selected regions of said first material a layer of a second material;
d. bombarding said epitaxial layer, said layer of first material, and said layer of second material with ions of selected energy, thereby doping surface regions of said epitaxial layer covered only by said first material and doping base regions within said epitaxial layer underlying said openings through said first material;
e. removing said second material; and
f. doping surface regions of said epitaxial layer within said openings, thereby defining emitter regions abutting said base regions.

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**4,025,365**

## METHOD OF PRODUCING HOMOGENEOUSLY DOPED p-CONDUCTIVE SEMICONDUCTOR MATERIALS

**Joachim Martin; Ernst Haas, both of Erlangen; Konrad Reuschel, Vaterstetten, and Manfred Schnöller, Haimhausen, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Filed Aug. 11, 1975, Ser. No. 603,678**
**Claims priority, application Germany, Aug. 16, 1974, 2439430**
**Int. Cl.² H01L *21/26***
**U.S. Cl. 148—1.5** **8 Claims**

1. A process of producing substantially homogeneously doped p-conductive semiconductor materials comprising irradiating a body composed of a select semiconductor material with a γ-photon stream and triggering nuclear reactions within said material to produce p-doping atoms.

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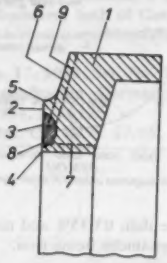
**4,025,366**

## METHOD OF MAKING ROTARY PISTON ENGINE CAST IRON INTERIOR SEALS BY QUENCH HARDENING

**Max Ruf, Obereisesheim, and Johannes Steinwart, Bad Friedrichshall II, both of Germany, assignors to Audi NSU Auto Union Aktiengesellschaft, Neckarsulm and Wankel GmbH, Lindau, Bodensee, both of, Germany**

**Division of Ser. No. 433,904, Jan. 16, 1974, abandoned. This application Aug. 22, 1975, Ser. No. 606,877**
**Claims priority, application Germany, Jan. 17, 1973, 2302119**
**Int. Cl.² B22D *25/00*; C21D *5/00*; F01C *21/00***
**U.S. Cl. 148—3** **3 Claims**

1. A method for fabricating an interior seal for rotary piston engines, in the form of a cast iron scraper ring arranged axially movable in an annular groove in an end face of the piston and having an annular scraping edge adapted to slide in sealing contact along the interior surface of the adjacent end wall of a housing, said annular scraping edge having a ledeburitic structure, comprising the steps of; forming a scraper ring blank of cast iron with a working face, providing an annular forming zone in the working face spaced from both ends thereof and positioned to include the location of the ultimate scraping edge, heating the face of the scraper ring blank along the annular zone to the melting temperature of the cast iron, cooling the melting zone so rapidly a ledeburitic structure is formed, and finishing the scraper ring to produce the scraper edge within the location of the annular zone.

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**4,025,367**

## PROCESS FOR TREATING COPPER ALLOYS TO IMPROVE THERMAL STABILITY

**Prakash D. Parikh, and Eugene Shapiro, both of Hamden, Conn., assignors to Olin Corporation, New Haven, Conn.**

**Filed June 28, 1976, Ser. No. 700,398**
**Int. Cl.² C22F *1/08***
**U.S. Cl. 148—11.5 C** **19 Claims**

1. A process for improving the thermal stability of copper base alloys having low stacking fault energy without significantly degrading tensile properties comprising:
a. providing a copper base alloy having a stacking fault energy of less than 30 ergs per square centimeter consisting essentially of a first element selected from the group consisting of about 2 to 12% by weight aluminum, about 2 to 6% by weight germanium, about 2 to 10% by weight gallium, about 3 to 12% by weight indium, about 1 to 5% by weight silicon, about 4 to 12% by weight tin, about 8 to 37% by weight zinc, balance copper;
b. cold working said alloy from about to 97%, 97%;
c. heating said alloy without significantly degrading the tensile properties thereof to a first temperature of from about 100° to 300° C for 15minutes to 8 hours;
d. further heating said alloy without significantly degrading the tensile properties thereof to a second temperature of from about 200° to 360° C for at least 1 minute, provided that said second temperature is higher than said first temperature; and
e. cooling said alloy to room temperature.

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**4,025,368**

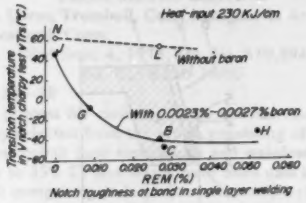
## WELDABLE STEEL EXCELLENT IN THE TOUGHNESS OF THE BOND IN A SINGLE LAYER WELDING WITH A LARGE HEAT-INPUT

**Koji Sanbongi, Matsudo; Tokushi Funakoshi, Ichihara; Tomoo Tanaka, and Syuzo Ueda, both of Chiba, all of Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan**

**Filed May 30, 1975, Ser. No. 582,256**
**Claims priority, application Japan, June 8, 1974, 49-65468**
**Int. Cl.² C22C *38/02***
**U.S. Cl. 148—36** **2 Claims**

1. A weldable hot-rolled steel capable of forming a tough bond after single layer large heat-input welding of more than 60,000 J/cm comprising 0.05 to 0.18% of carbon, 0.02 to 0.80 of silicon and 0.70 to 1.70% of manganese in coexistence with

0.010 to 0.050% of rare earth metal and 0.0010 to 0.0050% of boron, with the amount of phosphorus and sulphur being


Heat-input 230 KJ/cm
Without boron
With 0.0023%–0.0027% boron
Transition temperature in V-notch charpy test v Trs(°C)
REM (%)
Notch toughness of bond in single layer welding

limited to not more than 0.035% and not more than 0.015% respectively, the remainder being iron.

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**4,025,369**

## DEFLAGRATIVE EPOXY FOAM MATERIAL

**Luther A. Price, Phoenix, Ariz., and Theodore N. Bryla, Glendora, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Continuation-in-part of Ser. No. 113,749, Feb. 8, 1971, abandoned. This application Jan. 22, 1973, Ser. No. 329,260**

**Int. Cl.² C06B** *45/10*

**U.S. Cl. 149—19.6** **6 Claims**

1. A deflagrative epoxy foam composition, for electrical and thermal insulation in electronic assemblies, which upon ignition thereof will sustain combustion to provide a heat source for the non-catastrophic destruction of the assemblies adjacent thereto, produced from:

a. an initial mixture, one at a time in the given order, of:

44 percent by weight of a solid diglycide ether of bisphenol A resin having an average molecular weight (approx.) of 900 dissolved in 7.5 percent by weight of toluene to form a uniform solution;

1 percent by weight of polyoxyethylene sorbitan monolaurate,

42 percent by weight of potassium perchlorate,

1 percent by weight of dinitrosopentamethylene tetramine, and

4.5 percent by weight diethylene triamine;

b. said mixture being sequentially foamed and cured by heating at 190° C for approximately 15 minutes to form a foam composition having electrical and thermal insulating and mechanical physical properties suitable for separating and protecting delicate electronic assemblies, and which will sustain, upon ignition thereof, combustion to produce heat for destroying said electronic assemblies in a non-catastrophic manner.

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**4,025,370**

## DOUBLE BASE PROPELLANT CONTAINING AZOBISFORMAMIDE

**Elmer R. Csanady, Forest Heights; Paul R. Mosher, Indian Head, and Albert T. Camp, Welcome, all of Malagasy Republic, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Apr. 4, 1974, Ser. No. 459,421**

**Int. Cl.² C06B** *25/34*

**U.S. Cl. 149—92** **8 Claims**

1. In a double base propellant containing a ballistic modifier the improvement comprising the addition thereto of azobisformamide in an amount from about 0.5 to about 5.0 weight percent of the total composition.

**4,025,371**

## WELDING CONTAINERS

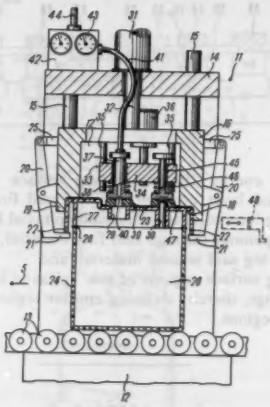
**Ernst Pecha, Nuertingen, Germany, assignor to Bielomatik Leuze & Co., Germany**

**Filed Mar. 1, 1976, Ser. No. 662,395**

**Claims priority, application Germany, Mar. 8, 1975, 2510258**

**Int. Cl.² G01D** *7/00*

**U.S. Cl. 156—64** **12 Claims**



3. Apparatus for welding covers to containers having at least one opening therein, which apparatus comprises:

means for pressing said covers onto said containers and for forming a weld seam therebetween;

pressure monitoring means; and

pressure connector means arranged in the region of said pressing-on means for connecting said monitoring means to said cover opening for testing the container for leaks under pressure whilst the pressing-on means is pressing the cover against the container.

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**4,025,372**

## METHOD OF MAKING A PADDED ITEM

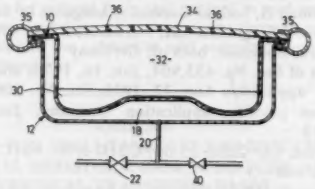
**Sidney Desmond Fenton, Preston, England, assignor to Storey Brothers & Company Limited, Lancaster, England**

**Continuation-in-part of Ser. No. 437,090, Jan. 28, 1974, abandoned. This application Sept. 9, 1975, Ser. No. 611,741**

**Claims priority, application United Kingdom, Jan. 31, 1973, 4931/73**

**Int. Cl.² B32B** *5/20*

**U.S. Cl. 156—79** **10 Claims**



1. A method of making a resilient fabric-faced upholstered item comprising the steps of:

a. shaping a laminate of a cast plasticized vinyl chloride homopolymer or copolymer sheet and a fabric by vacuum forming to the desired shape of a cover for said item by heating said vinyl chloride homo-polymer or copolymer sheet to a temperature of at least 150° C, said fabric being a knitted fabric having an extensibility in two directions at right angles of at least 25% under a load of 5 lb per 2 inch

wide strip and being capable of increasing its surface area by at least 50% when subjected to two loads of 5 lb applied at right angles to one another to the edges of a 2 inch square of said fabric, and said vinyl chloride homopolymer or copolymer sheet containing at least 35 parts of plasticizer per 100 parts of polymer;

b. holding said cover to shape in a mould with said fabric outermost and said cast vinyl chloride homopolymer or copolymer sheet innermost;

c. placing within said cover the precursors of a resilient foam; and

d. allowing said precursors to foam and fill said cover to provide a resilient foam filling, said foam becoming bonded to said vinyl chloride homopolymer or copolymer sheet of said laminate cover and retaining said cover in the required shape of said upholstered item.

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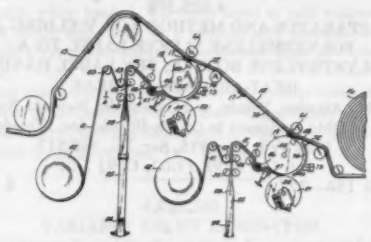
## 4,025,373
## METHOD FOR APPLYING ADHESIVE TAPES TO PADS

**John L. Hirsch, and Edmund A. Radzins, both of Sheboygan Falls, Wis., assignors to Curt G. Joa, Inc., Sheboygan Falls, Wis.**

**Division of Ser. No. 400,091, Sept. 24, 1973. This application Mar. 19, 1975, Ser. No. 559,994**
**Int. Cl.² B32B *31/00*; B31F *1/00***
**U.S. Cl. 156—66** **6 Claims**



1. A method of applying adhesive attaching tapes to workpiece pads and comprising the steps of

feeding to a tape folder an elongated strip of adhesive tape having an adhesive face and a non-adhesive back,

folding the elongated tape strip along a longitudinally extending hinge line to form substantially flat tape wings having their non-adhesive backs together and their adhesive faces facing away from each other,

applying a release liner to the adhesive face of one of the wings and leaving the adhesive face of the other wing exposed,

applying the lined wing of said elongated folded tape strip to a movable vacuum pad so that the lined wing is against the pad and the adhesive face of the other wing of the folded strip faces away from the pad,

severing discrete folded tape segments from the folded elongated strip while the strip is held by vacuum on the vacuum pad,

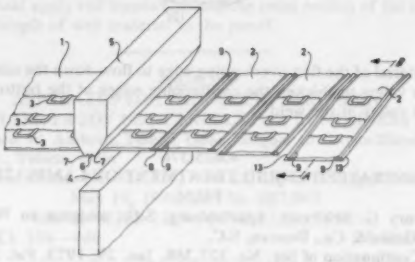
transferring the discrete folded tape segments from the vicinity of a severing tool to the vicinity of the workpiece pad by rotating the vacuum pad beyond the point of strip severance while the discrete folded tape segment is held by vacuum on the vacuum pad and into proximity to a portion of said workpiece pad,

and adhering the exposed adhesive face of said other wing to a portion of said workpiece pad in the course of drum rotation, with said one wing exposed and free to have the liner stripped therefrom and unfolded about said hinge line for application to another portion of the workpiece pad.

## 4,025,374
## METHOD FOR PRODUCING CLOSING MEMBERS FOR SUPPORTING HOOKS OR EYES

**Siegfried Wolfram Spindler, Schondorf, and Manfred Rudi Köhler, Unterpfaffenhofen, both of Germany, assignors to Ries GmbH Bekleidungsverschlussfabrik, Unterpfaffenhofen, Germany**

**Filed Jan. 17, 1975, Ser. No. 541,828**
**Claims priority, application Germany, Jan. 17, 1974, 2402212; July 26, 1974, 2436125**
**Int. Cl.² B29C *27/08***
**U.S. Cl. 156—73.1** **6 Claims**



1. A method for producing closing members from contiguous hook or eye tapes comprising top and bottom plies (**10** and **11**) made of thermoplastic material, a fabric insert (**12**) disposed between the two thermoplastic plies (**10** and **11**), and a cover strip **15** on which contiguous hooks or eyelets (**3**) are arranged in transverse rows, said method comprising the steps of:

a. advancing the tapes at a predetermined stepped rhythm;

b. forming two lips

i. in the edge zone of the tapes

ii. for attachment of the closing member to a garment

iii. by the insertion of a strip (**16**) of non-weldable material between the cover strip (**15**) and the top ply (**11**), which strip (**16**), however, does not prevent the edges of the two lips from being simultaneously welded by a single welding operation on one side of one of the lips; and

c. welding the cover strip (**15**) to the top ply (**11**) in the portion of the tapes other than the two lips, the side edge of the top ply (**11**) to the side edge of the bottom ply (**10**) in the two lips, and the side edge of the cover strip (**15**)

i. at right angles to the lips,

ii. by a single ultrasonic or high frequency linear welding operation on one side of the tapes,

iii. while the plies are temporarily stopped,

iv. until zones disposed between the transverse rows of hooks or eyes secured on the tapes are rendered suitable for separation.

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## 4,025,375
## METHOD FOR CONTINUOUS WELDING TOGETHER OF PLASTIC SHEETS

**William C. Leasure, Houston, Tex., assignor to Mira-Pak, Inc., Houston, Tex.**

**Filed May 23, 1972, Ser. No. 256,106**
**Int. Cl.² B29D *23/10***
**U.S. Cl. 156—79** **17 Claims**

1. A method of sealing together first and second adjacent overlapping edges of sheet material of the type joinable by welding, comprising: tensioning the sheet material in the direction parallel to said edges to form in at least said first overlapping edge stress lines which form a valley opened upwardly and extending substantially parallel to said edges and such that the ridge on the opposite side of the sheet from the valley protrudes downwardly towards and touches the second sheet, and applying heat to said overlapping edges to

melt the said first overlapping edge to weld the overlapping edges in the vicinity of said valley by causing the melted sheet

material of the first overlapping edge to flow down the sides of the valley to thicken the overlapping edges at the bottom of the valley at the weld.

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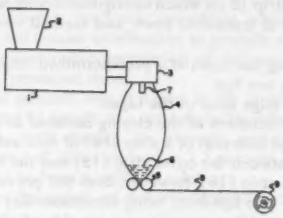
**4,025,376**

## ENTRAPPED LIQUID TREATMENT OF LAMINATED FILM

**Henry G. Schirmer, Spartanburg, S.C., assignor to W. R. Grace & Co., Duncan, S.C.**

**Continuation of Ser. No. 327,358, Jan. 29, 1973, Pat. No. 3,874,967. This application Sept. 23, 1974, Ser. No. 508,304**
**The portion of the term of this patent subsequent to Apr. 1, 1992, has been disclaimed.**
**Int. Cl.² B32B *31/30***
**U.S. Cl. 156—145** **4 Claims**



1. A method of treating laminated film with an entrapped liquid treating substance comprising the steps of:

a. providing a treatable polymeric film layer, the material of which is treatable by exposure of a surface thereof to said liquid treating substance;

b. laminating a permeable polymeric film layer immediately adjacent to said treatable layer with one surface thereof in contact with a surface of said treatable layer, said permeable layer being permeable to said liquid treating substance;

c. applying said treating liquid to the surface of said permeable layer which is not in contact with said treatable layer; and

d. applying an additional polymeric layer against said treating liquid to entrap same while it diffuses through said permeable layer to said treatable layer.

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**4,025,377**

## METHOD OF PRODUCING A BASEBALL BAT

**Yukio Tanikawa, No. 7203, Fukumitsumachi, Nishitonami, Toyama, Japan**

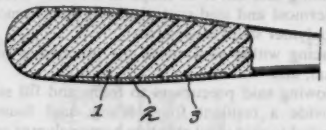
**Division of Ser. No. 451,377, March 14, 1974. This application Oct. 17, 1974, Ser. No. 515,717**
**Int. Cl.² A63B *59/06***
**U.S. Cl. 156—242** **5 Claims**

1. A method of producing a baseball bat comprising the steps of:

molding a main bat member having a barrel portion for hitting a baseball and a grip portion integral with said barrel portion from foamable synthetic resin around a wooden core longitudinally through at least said grip portion;

surrounding and fitting to said barrel portion an apertured metal tube;

foaming synthetic resin of the same type as comprises said main bat member through the apertures in said apertured



metal tube and smoothing said synthetic resin over said metal tube and said barrel portion;

wrapping said synthetic resin covered metal tube and barrel portion with strings of chemical fibers; and

spreading a coating of synthetic resin paint over said wrapping of chemical fiber strings and allowing said paint to permeate therethrough.

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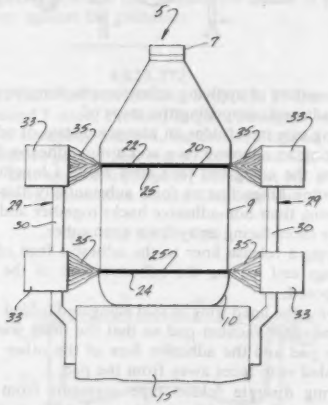
**4,025,378**

## APPARATUS AND METHOD FOR WELDING A POLYETHYLENE SLEEVE LABEL TO A POLYETHYLENE BOTTLE, THE LABEL HAVING HEAT-ABSORBING AREAS

**Donald L. Amsden, Toledo, and Casimir W. Nowicki, Sylvania, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio**

**Filed Feb. 10, 1975, Ser. No. 548,517**
**Int. Cl.² B29E *19/02*; C09J *5/00***
**U.S. Cl. 156—272** **6 Claims**




1. A method for attaching a polyethylene sleeve label to a polyethylene bottle, the bottle having a neck, a body and a bottom; the method comprising the steps of:

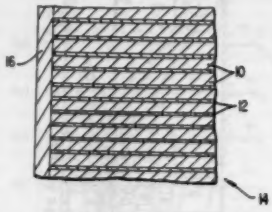
a. supporting said bottle with the label located around the body of the bottle, said label including means on the label for absorbing heat in local discrete areas at a rate greater than other areas of the label; and

b. welding the label to the bottle, with radiant heat without an adhesive, adjacent the heat-absorbing areas of the label at the junction of the outer surface of the body of said bottle and inner surface of said label to thereby prevent loss of the label.

## 4,025,379
## METHOD OF MAKING LAMINATED MAGNETIC MATERIAL

Clayton N. Whetstone, 1100 Penn Center Blvd., Apt. 1117, Pittsburgh, Pa. 15235

Division of Ser. No. 356,893, May 3, 1973, Pat. No. 3,880,603, which is a continuation-in-part of Ser. No. 79,864, Oct. 12, 1970, Pat. No. 3,756,788. This application Feb. 18, 1975, Ser. No. 550,731
Int. Cl.² C09J 5/00
U.S. Cl. 156—306 29 Claims




1. A method of making a magnetic laminated material for magnetic tape heads comprising the steps of:

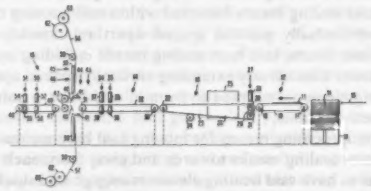
constructing a high permeability, low coercivity, wear resistant structure comprised of layers of magnetically soft metal separated by at least one layer of an inorganic material having a resistivity of more than $10^{-4}$ ohm-cm which, when heated, will both bond to said magnetically soft metal and result in a substantially continuous inorganic layer whose resistivity is greater than $10^{-4}$ ohm-cm; and

heating said structure to result in a laminate comprised of layers of substantially stress-free magnetically soft metal separated by and bonded to said inorganic material whose resistivity is more than $10^{-4}$ ohm-cm.

## 4,025,380
## VARIABLE RESIST LAMINATOR

Edward Thomas Bernardo, Endicott, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed July 24, 1975, Ser. No. 598,905
Int. Cl.² B26D 5/28; B65H 17/28
U.S. Cl. 156—355 4 Claims



1. A laminator for applying at least one sheet of material cut from a supply web to one side of a panel which comprises;

a vacuum bail for holding the leading portion of a supply web of material;

first feed means for feeding a panel and stopping it in a position opposite said vacuum bail;

means for operating said vacuum bail toward and away from said panel to press seal the leading edge of the web to one side of the panel;

rotating apply roll means;

means for operating said first feed means to feed the panel with the edge of the web attached past said apply roll means to press seal an additional length of the web to one side of the panel as said panel pulls the web;

second feed means for feeding the panel from said apply roll means and first feed means;

means for stopping said second feed means and the rotation of said apply roll means and the panel to stop the press sealing of said additional length of web;

a rotatable cutter blade mechanism movable across the width of the web;

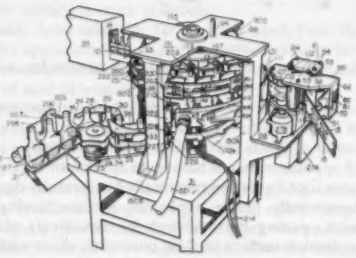
means responsive to the stopping of said second feed means and apply roll means for operating said cutter mechanism to shear a length of material from the web; and

means responsive at the completion of said shearing operation to restart operation of said second feed means and said apply roll means to complete press sealing of the cut length of web material to the panel.

## 4,025,381
## APPARATUS FOR PRODUCING SHRUNKEN PILFER-PROOF NECK LABELS FOR CONTAINERS

Stephen W. Amberg, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 526,124, Nov. 22, 1974. This application May 19, 1976, Ser. No. 687,969
Int. Cl.² B29D 23/10; B29C 17/00, 27/00
U.S. Cl. 156—446 8 Claims



1. Apparatus for forming a label sleeve from flexible rectilinear material comprising

means on the apparatus for moving an elongated web of flexible sheet-like material in a longitudinal direction,

means disposed along the longitudinally moving web for engaging said moving web for forming spaced-apart pleast therein,

means disposed along the longitudinal moving web after said means forming pleats therein for engaging said moving web for carrying it in a feed path defined by a cylindrical surface, said carrying means including a vacuum means connected to said cylindrical surface for holding the web thereon,

rotary knife means supported adjacent said cylindrical web-carrying surface for cooperating with said cylindrical surface for cutting the web thereon across its width and thereby severing a sleeve blank length from the web,

mandrel means having a peripheral surface adjacent the cylindrical carrying means surface engageable with the leading portion of the sleeve blank, said mandrel means including a vacuum means for holding said engaged leading portion on the mandrel surface, the peripheral dimension of said mandrel surface being less than the length of the blank,

means connected to said mandrel surface and operable, in response to engaging said leading portion of the blank, for winding said blank in leading and trailing end overlapping fashion thereon,

heater means adjacent the periphery of said mandrel surface operable in response to wrapping the blank on the mandrel surface for heating the leading and trailing end portions of the blank prior to overlapping said portions on the mandrel, the said heated end portions overlapping

one another on the mandrel surface in seam fashion, thereby forming the blank into a hollow sleeve, and stripper means associated with the mandrel and operable for axially stripping the formed sleeve from the mandrel.

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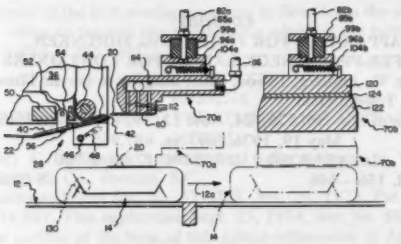
**4,025,382**
**LABEL APPLICATOR**
**Victor Del Rosso, Ithaca, N.Y., assignor to Hi-Speed Checkweigher Co., Inc., Ithaca, N.Y.**
**Filed July 14, 1975, Ser. No. 595,741**
**Int. Cl.² B65C** *9/14, 9/36*
**U.S. Cl. 156—497** **12 Claims**



**4.** An apparatus for applying labels to articles, which comprises:

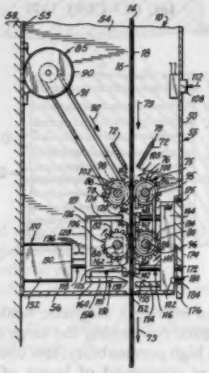
a conveyor for transporting said articles in succession along an essentially horizontal path of travel;

a source of labels spaced from said conveyor;

label applicator means having an applicator foot, said applicator foot having an essentially horizontally disposed and downwardly facing applicator surface having passageways opening therethrough for selectively placing said applicator surface in flow communication with a source of vacuum, whereby to enable said applicator foot to releasably pick up a label engaged with said applicator surface, a supporting assembly having a stationary mounting bracket disposed above said conveyor, a slide assembly carried by said mounting bracket for vertical reciprocating movement towards and away from said conveyor, a support carried by said slide assembly adjacent a lower end thereof for mounting said applicator foot, and means for effecting vertical reciprocating movements of said slide assembly whereby to move said applicator foot between an upper rest position in which it is arranged to pick up said labels from said source and a lower operative position in which it is arranged to apply said labels to said articles, said source of labels being operable to feed one label at a time into sliding engagement with said applicator surface, while said applicator foot is in said upper rest position, said applicator foot being slidably carried by said support for horizontal reciprocating movement in the direction of said path of travel and spring means is provided for normally retaining said applicator foot in a horizontal rest position disposed in vertical alignment with said upper rest portion, said spring means being deformable to permit conjunctive movement of said applicator foot with said article in the direction of conveyor travel while in label applying engagement therewith; and

label compression means arranged relatively downstream of said label applicator means along said path of travel and including a compressor foot mounted for reciprocating movements transversely of said path of travel for removably applying pressure to an article surface applied label for mold forming same to assume the controur of the surface of an article to which it is applied, and for conjunctive movement with such article in alignment with said path of travel as an incident to pressure mold forming of said label applied thereto.

**4,025,383**
**HOME BAG SEALER**
**Albert R. Ferrigno, 9 Ravine Road, Great Neck, N.Y. 11023**
**Filed Aug. 2, 1976, Ser. No. 711,098**
**Int. Cl.² B32B** *31/00;* **B30B** *15/34*
**U.S. Cl. 156—530** **30 Claims**



**1.** Apparatus for forming bags of desired length from flattened plastic tubular stock material, comprising

a. housing means,

b. supporting means within said housing means for rotatably mounting a supply roll of said flattened stock material,

c. guide means in vertically spaced relationship to said supporting means within said housing means and including a pair of spaced apart transversely extending guide members adapted to receive said stock therebetween,

d. advancing means including a pair of rollers for engagement with said stock within said housing means in vertically spaced apart relationship to said guide means,

e. base means adjacent said advancing means in said housing means, and having a support surface across which said stock is adapted to be advanced from said supply roll by said advancing means through said guide means,

f. heat sealing means mounted within said housing means in substantially parallel spaced apart relationship to said base means, said heat sealing means including upper and lower transversely extending vertically spaced apart heating elements adapted to form in said stock a pair of heat sealed seams,

g. reciprocating means for moving said base means and said heat sealing means towards and away from each other so as to have said heating elements engage said stock on said support surface and thereby form said heat sealed seams,

h. first cutting means to form a vertically extending slit between said seams so as to provide a pocket therein,

i. second cutting means to sever said stock along a line adjacent and forwardly of the lowermost of said seams, such that a previously formed bag is released from said housing means, and

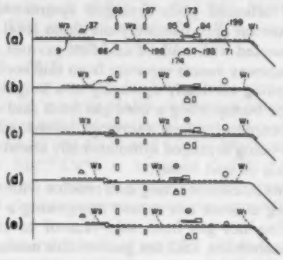
j. energizing means operatively associated with said advancing means, said heat sealing means, said reciprocating means and said first and second cutting means, such that said stock is initially moved by said advancing means between said heat sealing means and said base means to a position to activate said reciprocating means so as to form said seams and said first and second cutting means forming a vertical slit and cutting off a previously formed bag.

4,025,384

## APPARATUS FOR SPLICING RUBBER COATED CORD FABRIC SECTIONS

Tadao Shiozaki, and Daitetsu Meguro, both of Sayama, Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Dec. 22, 1975, Ser. No. 643,382
Claims priority, application Japan, Dec. 27, 1974, 50-3637
Int. Cl.² B29H 9/04
U.S. Cl. 156—502 7 Claims




1. An apparatus for splicing rubber coated cord fabric sections in which a continuous rubber coated parallel cord fabric strip having side edges is obliquely severed into rhomboidal cord fabric sections and said side edges are thereafter overlapped and spliced in regular succession into a continuous bias cord fabric strip, comprising:

a bias-cutter conveyor including a conveyor for transferring said continuous cord fabric and a bias-cutter mounted on said conveyor for obliquely severing said cord fabric strip into rhomboidal cord fabric sections;

a positioning mechanism for positioning each of said severed cord fabric sections to have obliquely severed edges orientated to a conveyance direction thereof with said side edges obliquely arranged to said conveyance direction thereof;

a transfer mechanism positioned forwardly of said positioning mechanism for suckingly holding and intermittently transferring each of said cord fabric sections;

a conveyor mechanism positioned forwardly of said transfer mechanism and including a plurality of endless belts running along the conveyance direction of said cord fabric with a predetermined space therebetween and having a number of air nozzles formed in a longitudinal direction thereof, a belt guide plate positioned inwardly of said endless belts and having a plurality of grooves each receiving and guiding said endless belt, a plurality of air pipes each pneumatically communicating with said grooves through a longitudinal slit formed at the bottom of each of said grooves, each of said air pipes having a rear portion rearwardly of the splicing mechanism with respect to the conveyance direction of said cord fabric section to be vacuumed and a remaining portion to be vacuumed and supplied with compressed air, and drive means for intermittently running said endless belts, whereby said cord fabric sections received from said transfer mechanism are transferred; and

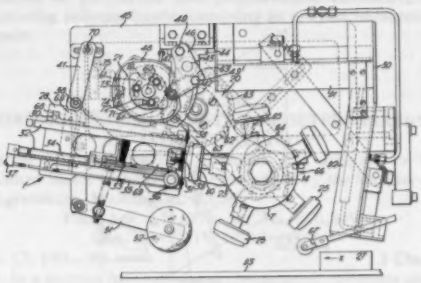
a splicing mechanism positioned above the longitudinally intermediate portion of said conveyor mechanism for pulling back a previously advanced cord fabric section to overlap and splice the trailing edge of said previously advanced cord fabric section on the leading edge of a subsequently advanced cord fabric section.

4,025,385

## LABEL APPLICATORS

William Wood, Naphill, England, assignor to Green Shield Trading Stamp Company Limited, Edgware, England

Filed Nov. 5, 1975, Ser. No. 629,132
Claims priority, application United Kingdom, Nov. 14, 1974, 49348/74
Int. Cl.² B65C 9/08
U.S. Cl. 156—568 13 Claims



1. A label applicator comprising a reciprocating movable hopper for holding a stack of labels;

a rotatable head assembly for carrying labels from the hopper for application, the head assembly having at least one depressable suction head having a suction surface depression of said at least one suction head;

a stepping drive mechanism operable to rotate the head assembly so that said at least one suction head successively registers with the hopper for receiving a label therefrom;

actuating means synchronised with the stepping drive mechanism to effect a single reciprocation, comprising a forward and a return stroke, of the hopper when said at least one suction head is in registration, whereby the hopper depresses the registering suction head with the end label of the stack engaging the suction surface thereof;

valve means operating on depression of the registering suction head to apply suction to the suction surface thereof, to hold the end label on the suction head;

latching means operative to prevent return movement of the depressed suction head under the influence of the resiliently opposing means, whereby the end label is withdrawn from the stack and held by the depressed suction head on the return stroke of the hopper;

and release means arranged to cause the latching means to release the depressed suction head, thereby disconnecting suction therefrom, when the depressed suction head is brought from registration with the hopper to a predetermined orientation by rotation of the head assembly.

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4,025,386

## METHOD FOR PRODUCING R-PLANE SINGLE CRYSTAL ALPHA ALUMINA IN MASSIVE FORM HAVING SUBSTANTIALLY CIRCULAR CROSS-SECTION

Larry R. Rothrock, Poway, Calif., assignor to Union Carbide Corporation, New York, N.Y.

Continuation of Ser. No. 535,093, Dec. 20, 1974, abandoned. This application June 28, 1976, Ser. No. 700,588
Int. Cl.² B01J 17/18; C01F 7/02
U.S. Cl. 156—617 SP 1 Claim

1. In a process for the production of massive unicrystalline alpha alumina by

i. forming a melt of alumina by heating the same to form a melt at a temperature of at least 2040° C,

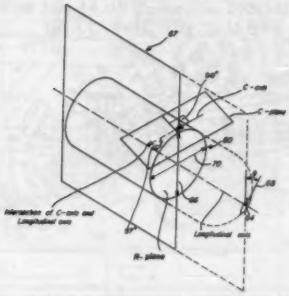
ii. inserting a seed rod of alpha alumina into the melt,

iii. maintaining an atmosphere over the melt which is substantially chemically inert to the melt,

iv. withdrawing the seed rod from the melt such that alu-

mina material is solidified and crystallized on the seed rod to form a massive unicrystalline product of increasing length having a growth axis common with the longitudinal axis of the seed rod, the improvement for producing massive unicrystalline R-plane alpha alumina of substantially circular cross-section which comprises

a. employing as the seed rod unicrystalline alpha alumina having an orientation such that its longitudinal axis is 57½° from the C-axis of the seed crystal and is normal to an R-plane of said seed rod and



b. rotating said seed rod about its longitudinal axis at a rotation rate such that the solidified and crystallized alumina material upon withdrawal from the melt has an elongated end portion facet, the major axis of which, lying in a plane perpendicular to the longitudinal axis of the solidified and crystallized material, is substantially perpendicular to the plane defined by the C-axis and the longitudinal axis of the solidified and crystallized material.

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**4,025,387**

## NUCLEAR POWER PLANT WITH CLOSED GAS-COOLING CIRCUIT COMPRISING MULTIPLE IDENTICAL THERMODYNAMIC CIRCUITS

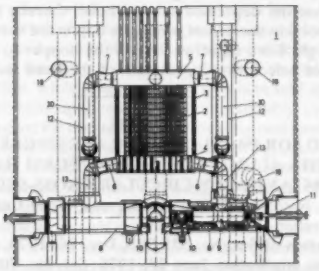
**Dirk Haferkamp; Alija Hodzic, both of Mannheim, and Ulrich Winter, Eppelheim, all of Germany, assignors to Hochtemperatur-Reactorbau GmbH, Mannheim, Germany**

**Filed Nov. 17, 1975, Ser. No. 632,772**

**Claims priority, application Germany, Nov. 16, 1974, 2454451**

**Int. Cl.² G21C *19/28***

**U.S. Cl. 176—60** **23 Claims**



1. In a nuclear power plant including a thick walled pressure vessel, a nuclear reactor housed within said vessel, a plurality of separate parallel-connected, symmetrically arranged cooling circuits each comprising as components a turbine assembly, each assembly including a turbine and compressor, recuperative heat exchange means and cooling heat exchange means, each component being housed in a cavity in the vessel wall, and means defining passageways interconnecting the reactor with said turbine, the outlet of said turbine with said recuperative heat exchange means and said cooling heat exchange means with said compressor to form a closed gas coolant circuit for the reactor, the improvement which comprises:

a. a first set of said cavities for housing each one of said turbine assemblies, each of said first cavities being a horizontally oriented shaft located on the same level as each of the other first cavities in the lower region of said vessel, the cavities of said first set being disposed symmetrically about the vertical central axis of said vessel;

b. a second set of said cavities for housing said heat exchange means, said second cavities being in the form of vertically oriented pods arranged symmetrically about said reactor on approximately the same level therewith;

c. interconnected with each of said first cavities at least one first passageway means separate from said second cavities and extending vertically upwardly to a height above said reactor for transporting a cool gas from said compressor to said recuperative heat exchange means, said first passageways being arranged symmetrically about the vertical central axis of said vessel;

d. said means interconnecting said reactor with said turbine comprising at least one means comprising a conduit for transporting hot gas from said reactor to each of said turbine assemblies, said hot gas conduit means extending vertically over at least part of its length within said first passageway in coaxial relationship with said first passageway; and

e. at least one means comprising a conduit for transporting reheated gas from said recuperative heat exchange means in each circuit to said reactor, said reheated gas conduit means extending vertically over at least part of its length within said first passageway in coaxial relationship therewith and being axially spaced from said hot gas conduit means in the same first passageway.

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**4,025,388**

## SHUTTING DOWN GAS COOLED NUCLEAR REACTORS

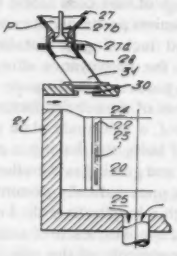
**Fred Jackson, Annan, Scotland, assignor to British Nuclear Fuels Limited, Warrington, England**

**Filed Dec. 20, 1974, Ser. No. 534,786**

**Claims priority, application United Kingdom, Dec. 27, 1973, 59884/73**

**Int. Cl.² G21C *7/06***

**U.S. Cl. 176—86 R** **15 Claims**



1. In a gas cooled nuclear reactor having a reactor core with coolant channels therethrough, a material, for introduction into said coolant channels to effect reactor shutdown, said material being normally contained at a region remote from said reactor core and comprising a plurality of coherent, free-flowing pellets each pellet comprising a solid neutron poison material and a solid organic substance, said organic substance remaining solid at a first, relatively low, temperature prevailing in said coolant channel at said region remote from the reactor core to allow free flow of the pellets through the coolant channel, said organic substance melting at a sec-

ond, relatively high, temperature prevailing in said coolant channel at a region within the reactor core, the molten organic substance being adherent to a coolant channel wall and to the solid neutron poison material and thus capable of adhering the solid neutron poison substance to a coolant channel wall in the reactor core.

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## 4,025,389
## PROCESS AND ISOMERIZING GLUCOSE

**Poul Borge Rosenius Poulsen, Vaerlose, and Lena Elisabeth Zittan, Kokkedal, both of Denmark, assignors to Novo Industri A/S, Bagsvaerd, Denmark**

**Continuation-in-part of Ser. No. 558,001, March 13, 1975, abandoned. This application Feb. 27, 1976, Ser. No. 662,271**
**Int. Cl.² C12D** *13/00*
**U.S. Cl. 195—31 F** **9 Claims**

1. A continuous process for isomerizing glucose syrup to a glucose fructose mixture which comprises passing a 30–55% by weight of a starch hydrolysate glucose syrup which contains not more than $10^{-3}$M $Ca^{++}$ and $10^{-2}$M $Mg^{++}$, and where the molar ratio $Mg^{++}$:$Ca^{++}$ is between 5–500:1 for $Mg^{++}$ > $10^{-3}$M, through a bed of glutaraldehyde immobilized and cross-linked glucose isomerase particles exceeding about 100 microns derived from the action of ruptured cells of *B. coagulans* with glutaraldehyde at an inlet pH in the range of pH 7.8–8.6 at temperatures in the range of 60°–85° C. for a total contact time of less than 3.5 hours, and isomerizing the syrup thereby to at least 40% fructose by weight of the glucose fructose content.

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## 4,025,390
## METHOD FOR RECOVERING UROKINASE FROM A UROKINASE-CONTAINING SOLUTION

**Masaharu Urakawa, and Hiroshi Sumiyama, both of Hitachi, Japan, assignors to Hitachi Chemical Company, Ltd., Tokyo, Japan**

**Filed Apr. 13, 1976, Ser. No. 676,489**
**Claims priority, application Japan, Apr. 18, 1975, 50-47099**
**Int. Cl.² C07G** *7/026*
**U.S. Cl. 195—66 B** **7 Claims**

1. A method for recovering urokinase which comprises bringing a urokinase-containing solution into contact with at least one compound selected from the group consisting of cyanoalkyl polysaccharide, cyanoalkyl modified-polysaccharide and cyanoalkyl polyvinyl alcohol to subject urokinase to adsorption and then eluting the urokinase from the adsorbate, said cyanoalkyl group being a cyano-lower-alkyl group having from 2 to 4 carbon atoms including the carbon atom of the cyano group.

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## 4,025,391
## PREPARATION OF BEAD-SHAPED IMMOBILIZED ENZYME

**Koji Kawashima, Chofu, and Keiji Umeda, Tokyo, both of Japan, assignors to Director of National Food Research Institute, Tokyo, Japan**

**Continuation-in-part of Ser. No. 585,488, June 10, 1975, abandoned. This application Dec. 4, 1975, Ser. No. 637,672**
**Claims priority, application Japan, June 15, 1974, 49-67640**
**The portion of the term of this patent subsequent to June 8, 1993, has been disclaimed.**
**Int. Cl.² C07G** *7/02*
**U.S. Cl. 195—68** **6 Claims**

1. Process for producing an immobilized enzyme in bead form, which comprises adding (i) an aqueous solution containing (a) an enzyme and (b) at least one polymerizable substance capable of being radiopolymerized, said substance being selected from the group consisting of acrylamide, acrylic acid, methacrylic acid, sodium acrylate, potassium acrylate, calcium acrylate, magnesium acrylate, ferrous acrylate, cobalt acrylate, nickel acrylate, magnesium methacrylate, ferrous methacrylate, cobalt methacrylate, nickel methacrylate, acrylonitrile, propylene glycol, pyrrolidone, 1-vinyl-2-pyrrolidone, hydroxy ethyl methacrylate, hydroxy methyl acrylamide, diacetone acrylamide, and polyvinyl alcohol having a polymerization degree of 1400, to (ii) a water-insoluble fluid or a fluid having a solubility in water of up to about 15 percent, whereby beads containing said enzyme are formed in the resulting mixture, freezing the resulting mixture at a temperature of from −200° C. to −5° C., irradiating the resultant frozen mixture at said temperature under aerobic conditions with a dose of radiation of from 30 to 1000 Krad of ionizing radiation to polymerize said polymerizable substance, and recovering polymer beads containing an enzyme immobilized therein.

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## 4,025,392
## CHROMOGENIC SUBSTRATE FOR DETERMINATION OF AMYLASE ACTIVITY

**Therese Marie Dougherty, Lansdale, Pa., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Filed Apr. 14, 1976, Ser. No. 676,949**
**Int. Cl.² G01N** *33/00, 31/14*
**U.S. Cl. 195—99** **2 Claims**

1. In a process for preparing a chromogenic substrate product for the determination of amylase activity wherein amylose is reacted with Cibachron Blue F3GA, sodium sulfate and trisodium phosphate and the resulting dyed amylose substrate washed and dried, the steps for obtaining an improved highly sensitive substrate product having especial efficacy for determining α-amylase activity in plant and other very dilute enzyme extracts, comprising incubating the substrate obtained by the aforesaid reaction at about 44° C in a 0.04M phosphate buffer containing 0.001M calcium chloride, washing the incubated with water until practically colorless, and freeze-drying the washed product.

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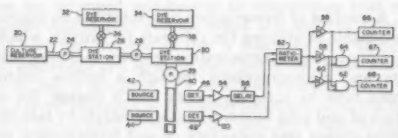
## 4,025,393
## SYSTEM FOR DETECTING GROWTH IN MICROORGANISMS

**Tomas Hirschfeld, Framingham, Mass., assignor to Block Engineering, Inc., Cambridge, Mass.**

**Filed Nov. 17, 1975, Ser. No. 632,244**
**Int. Cl.² C12K** *1/04*
**U.S. Cl. 195—103.5 M** **15 Claims**



1. Apparatus for identifying within a mixed population of microorganisms, a group of microorganisms replicating in a specific culture medium in which only said group can replicate, said medium including a fluorescence inhibitor which said group will incorporate within its nucleic acid during replication, and which will inhibit the normal fluorescent emission from at least one selected fluorescent biological dye capable of bonding to said nucleic acid, said apparatus comprising in combination:

means for dyeing a sample of said population with said selected fluorescent dye;

means for exciting fluorescent emissions from the dyed sample; and

means for measuring the intensities of at least two different fluorescent emissions from said dyed sample upon excitation thereof and

means for determining the ratio of said intensities, said ratio being a value substantially independent of the total nucleic acid content of each of said microorganisms and dependent substantially only upon the fractional extent of

incorporation of said inhibitor into nucleic acid during said replication.

6. In a method of identifying, in a mixed population of microorganisms, a group of microorganisms grown in a culture medium in which substantially only said group of microorganisms can replicate, the nucleic acid of a sample of said group being thereafter dyed by at least one fluorescent dye, said medium containing an inhibitor agent which said organisms of said group incorporated into their nucleic acid during replication, said agent and said dye being selected so that upon stimulation by radiation normally capable of exciting fluorescent emissions from said dye, the emission from said dye bound to nucleic acid containing said agent will be inhibited, the improvement comprising the step of:

measuring the intensities of at least two different fluorescent emissions from said microorganisms of said sample upon stimulation thereof by exciting radiation,

determining a ratio based on the two different emissions, said ratio being a value substantially independent of the total nucleic acid content of the microorganisms of said population and dependent substantially only upon the fractional extent of incorporation of said agent into nucleic acid during replication.

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**4,025,394**

## FERMENTATION PROCESSES USING SCRAPED TUBULAR FERMENTOR

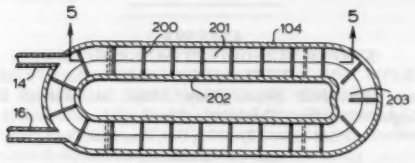
**Murray Moo Young, Waterloo, Canada, assignor to The University of Waterloo, Waterloo, Canada**

**Filed Feb. 17, 1976, Ser. No. 658,836**

**Claims priority, application United Kingdom, May 6, 1975, 19044/75**

**Int. Cl.² C12B *1/00***

**U.S. Cl. 195—115** **29 Claims**




1. A method of fermentation of a substrate by microorganisms capable of utilizing the substrate for growth, which comprises conveying a fermentation medium including said substrate and microorganisms through a hollow uncompartmented tube by scraping means which engage the interior surface of said tube fermenting said substrate by said microorganisms during said conveying of said fermentation medium through said tube, and scraping the internal walls of said tube during said conveying of said fermentation medium through said tube.

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**4,025,395**

## METHOD FOR QUENCHING COKE

**LaVerne G. Ekholm, McKeesport; Bernard R. Kuchta, Plum Borough, and Joseph P. McGinness, McKeesport, all of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.**

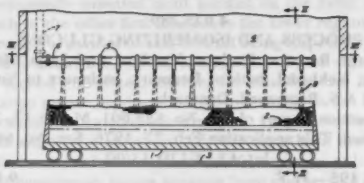
**Continuation of Ser. No. 442,709, Feb. 15, 1974, which is a continuation-in-part of Ser. No. 168,659, Aug. 3, 1971, Pat. No. 3,806,425. This application Mar. 24, 1975, Ser. No. 561,390**

**The portion of the term of this patent subsequent to Apr. 23, 1991, has been disclaimed.**

**Int. Cl.² C10B *39/08***

**U.S. Cl. 201—39** **3 Claims**

1. The method for the rapid liquid quenching of coke which comprises distributing hot coke on a quenching surface having a bottom drain to form a bed of coke and flowing streams of quench liquid from spaced apart pipes through the bed of coke at spaced apart locations so that prior to striking the surface of the coke bed, there is no substantial breaking up of the quench liquid into droplets, and so that the quench liquid penetrates the bed prior to complete vaporization, at least



some of it flowing out of the bottom drain, and rapidly quenches the coke while avoiding flooding thereof, as the vapor and liquid percolate through the surrounding bed, and oscillating the stream of quench liquid gradually over the surface of the coke.

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**4,025,396**

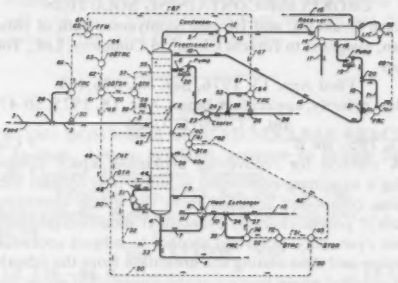
## METHOD AND SYSTEM FOR FRACTIONATION HEAT BALANCE CONTROL

**Jarrell T. Green, Mount Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.**

**Filed Nov. 28, 1975, Ser. No. 636,179**

**Int. Cl.² B01D *3/42***

**U.S. Cl. 203—2** **8 Claims**



5. A method for maintaining the heat balance of a fractionation column, wherein (i) a feed stream is introduced through a locus intermediate the top and bottom; (ii) a liquid bottoms material is recovered from the lower end, and at least a portion thereof is partially vaporized and returned to the reboiler section; (iii) a vaporous overhead stream is withdrawn from the upper end, condensed and at least a portion thereof is returned to the rectification section as a reflux stream; and, (iv) a liquid overhead product stream is recovered through a locus below that through which said reflux stream is returned, which method comprises the steps of:

a. sensing a first temperature differential between two vertically spaced, temperature-sensing points, both of which are below said feed locus and proximate thereto, measuring said first delta-T and generating a first signal representative thereof;

b. sensing a second temperature differential between two vertically spaced, temperature-sensing points below said feed locus, one of which is proximate thereto and the second of which is proximate to the locus through which said partially vaporized liquid bottoms material is returned to said reboiler section, measuring said second delta-T and generating a second signal representative thereof;

c. obtaining a first computed relationship of said first and

second signals, generating a third output signal representative of said first relationship and regulating the degree to which said liquid bottoms material is vaporized, in response to said third signal;

d. sensing a third temperature differential between two vertically spaced, temperature-sensing points above said feed locus, one of which is proximate thereto, and the second of which is proximate to the locus through which said liquid overhead product stream is recovered, measuring said third delta-T and generating a fourth signal repesentative thereof;

e. obtaining a second computed relationship of said second and fourth signals, and generating a fifth signal representative of said second relationship;

f. measuring the rate of flow of said feed stream and generating a sixth signal representative thereof;

g. comparing said fifth and sixth signals, generating a seventh signal representative of the resulting comparison and regulating the quantity of said liquid overhead stream withdrawn as an overhead product stream, in response to said seventh signal; and,

h. regulating the rate of flow of said reflux stream responsive to the rate of flow of said overhead product stream.

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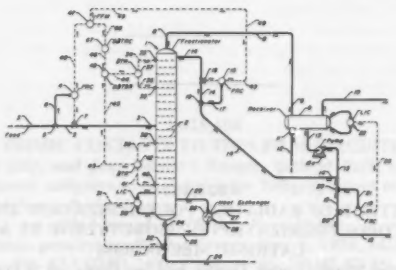
**4,025,397**

## METHOD AND SYSTEM FOR FRACTIONATION CONTROL RESPONSIVE TO HEAT BALANCE

**Jarrell T. Green, Mount Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.**

**Filed Nov. 28, 1975, Ser. No. 636,181**
**Int. Cl.² B01D** *3/42*
**U.S. Cl. 203—2** **6 Claims**



**5.** A method for controlling a fractionation column, wherein (i) a feed stream is introduced through a locus intermediate the top and bottom thereof; (ii) liquid bottoms material is recovered from the lower end of said column, and at least a portion thereof is partially vaporized and returned to the reboiler section; and, (iii) overhead material is recovered from the upper end of said column, condensed and at least a portion thereof returned to the rectification section as a reflux stream, which method comprises the steps of:

a. maintaining an inventory of liquid bottoms material in said reboiler section, sensing the level of said liquid inventory and regulating the quantity of net bottoms product leaving the column responsive to said level, while presetting the rate of heat-input to said reboiler section via said partially vaporized bottoms material;

b. sensing a first temperature differential between two vertically-space temperature-sensing points below said feed locus one of which is procimate thereto and the second of which is proximate to the locus through which said partially vaporized liquid bottoms material is returned to said reboiler section, measuring the resulting first delta-T and generating a first signal representative thereof;

c. sensing a second temperature differential between two vertically-spaced temperaure-sensing points above said feed locus both of which are proximate to the locus of overhead withdrawal, measuring the resulting second delta-T and generating a second signal representative thereof;

d. obtaining a first computed relationship of said first and second signals and generating a third signal representative of the resulting first relationship;

e. generating a fourth signal responsive to a comparison of said third signal with a pre-set, adjustable value;

f. measuring the rate of flow of said feed stream and generating a fifth signal representative thereof;

g. obtaining a second computed relationship of said fourth and fifth signals, and generating a sixth signal representative of the resulting second relationsiip; and,

h. regulating the quantity of said returned reflux stream responsive to said sixth signal.

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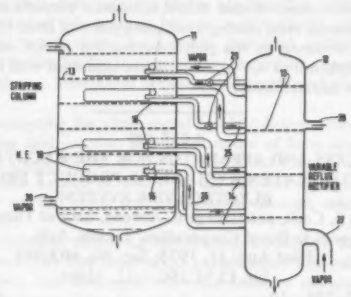
**4,025,398**

## DISTILLATION PROCESSES AND APPARATUS

**Geoffrey Gordon Haselden, 12 High Ash Drive, Leeds, Yorkshire, England**

**Filed Mar. 21, 1975, Ser. No. 560,812**
**Claims priority, application United Kingdom, Apr. 11, 1974, 16391/74**
**Int. Cl.² B01D** *3/00, 3/14;* **F02M** *11/00*
**U.S. Cl. 203—25** **18 Claims**



**1.** Distillation apparatus wherein first and second distillation columns are arranged side-by-side to interchange heat with one another and thereby provide reboil at a series of different levels in said first column so that it functions as a stripping column, and reflux at a series of different levels in said second column so that it functions as a rectifying column, thereby to achieve a close approach to thermodynamically ideal fractionation, said first column comprising a feed inlet near its upper end for admitting to said first column a liquid feed stream containing higher and lower boiling components, outlets for gas and liquid respectively at the top and bottom of said first column, means within said first column for promoting contact between rising gas and descending liquid thereby to create regions of mixed gas/liquid phase in the form of froth within said first column, and a plurality of indirect heat transfer means in said first column at intervals along its height and located in said froth regions, said second column including a feed inlet near its lower end for admitting to said second column a gas stream containing higher and lower condensing components, outlets for gas and liquid respectively at the top and bottom of said second column, means within said second column for promoting contact between rising gas and descending liquid, a plurality of vapor withdrawal ducts at intervals along the height of said second column and equal in number to the number of heat transfer means in said plurality of indirect heat transfer means in said first column, the lowest such withdrawal duct being connected to convey vapor into the lowest of said indirect heat transfer means for partial condensation therein without mixing with the fluids in said

first column, the next withdrawal duct above the lowest being connected to convey vapor into the next heat transfer means above the lowest, and so on up the height of said columns, and a plurality of return duct means, equal in number to vapor withdrawal ducts, for conducting condensate and condensed vapor from a respective heat transfer means to a point of re-entry to said second column at a level just above its corresponding vapor withdrawal level.

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4,025,399

## IMAGE RECORDING MEMBER

Masakazu Matsumoto; Katsuhiko Nishide, both of Yokohama; Akemi Shimosawa, Tokyo, all of Japan, and Kikuo Kinjo, deceased, late of Tokyo, Japan (by Ayako Kinjo, legal successor), assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 7, 1975, Ser. No. 565,585

Claims priority, application Japan, Apr. 8, 1974, 49-39626; Apr. 8, 1974, 49-39627; Apr. 8, 1974, 49-39628; Apr. 10, 1974, 49-41194; Apr. 10, 1974, 49-41195; Apr. 10, 1974, 49-41196

Int. Cl.² B41M *5/20*; G01D *15/34*

U.S. Cl. 204—2 24 Claims

1. In an electrical recording member which comprises a substrate and a recording layer overlying said substrate and containing, dispersed in a binder, a conductive agent, a leuco base and an acidic substance, whereby said leuco base and acidic substance react to produce an image upon the passage of an electric current through said recording layer, the improvement wherein said acidic substance consists essentially of a phenolic resin having a softening point of from 40° to 200° C and obtained by the polycondensation of 4,4′-isopropylidene diphenol or 4,4′-sec-butylidene diphenol with formaldehyde or acetaldehyde.

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4,025,400

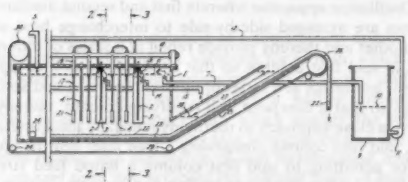
## PROCESS AND APPARATUS FOR THE RECOVERY OF PARTICULATE CRYSTALLINE PRODUCT FROM AN ELECTROLYSIS SYSTEM

Melvin S. Cook, and George E. Atwood, both of Tucson, Ariz., assignors to Duval Corporation, Tucson, Ariz.

Filed Aug. 11, 1975, Ser. No. 603,394

Int. Cl.² C25C *1/12*, *15/08*

U.S. Cl. 204—10 27 Claims



1. In an electrolysis system capable of producing a particulate crystalline product a particulate crystalline product having limited adherence to the surface of the cathodes, a process for the continuous recovery of said product directly from the electrolytic cell tank substantially uncontaminated by adhering electrolyte, comprising:

a. Agitating the electrolyte liquor so as to effectively influence and contribute to the control of the crystalline product size and density as well as the structural competence of the dendrites and to cause said product to separate from the cathodes;

b. Collecting the particulate crystalline product separated from the cathodes on a conveyor transport system located in the bottom part of the electrolytic cell tank;

c. Continuously removing the particulate crystalline product from the electrolytic cell tank by means of the conveyor transport system; and

d. Transporting the particulate crystalline product through a washing zone prior to its removal from the electrolytic cell tank so as to displace the electrolyte liquor from the particulate crystalline product.

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4,025,401

## METHOD FOR DIAPHRAGM ELECTROLYSIS OF ALKALI METAL HALIDES

Hiroshi Fujiwara; Kinya Jawara; Kaoru Miyoshi, and Makoto Mukai, all of Soka, Japan, assignors to Maruzen Oil Co. Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 540,788, Jan. 13, 1975, abandoned. This application Sept. 24, 1975, Ser. No. 616,461

Claims priority, application Japan, Oct. 21, 1974, 49-121229

Int. Cl.² C25B *1/16*, *1/26*, *13/08*

U.S. Cl. 204—98 23 Claims

1. A method for diaphragm electrolysis of an alkali metal halide which comprises electrolyzing an alkali metal halide solution by passing an electric current through an anode compartment and a cathode compartment of an electrolytic cell containing the alkali metal halide solution with an ion-exchange membrane of a graft copolymer of a polyolefin main chain and a side chain composed mainly of a dihydroxystyrene and grafted to said polyolefin main chain separating the anode compartment and the cathode compartment.

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4,025,402

## METHOD OF RADIATION POLYMERIZATION AND COPOLYMERIZATION OF ISOBUTYLENE BY A CATIONIC MECHANISM

Miroslav Marek; Ludek Toman, and Jan Pecka, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Division of Ser. No. 275,157, July 26, 1972, Pat. No. 3,897,322. This application Apr. 3, 1975, Ser. No. 564,604

Claims priority, application Czechoslovakia, July 29, 1971, 5555/71

Int. Cl.² C08D *1/00*; C08F *1/16*

U.S. Cl. 204—159.24 6 Claims

1. A method for the polymerization and copolymerization of mono-olefinic monomers polymerizable by a cationic mechanism, which comprises subjecting to a source of light selected from the group consisting of unltraviolet light, visible light, and infrared light at a temperature between about 0° C. and about −140°C. a polymerizable mixture selected from the group consisting of isobutylene and mixtures of isobutylene with at least one diolefinic monomer selected from the group consisting of butadiene and isoprene, chloroprene, dimethallyl, piperylene, cyclohexadiene, cyclopentadiene, and alkoxybutadienes in the presence of at least one halide catalyst selected from the group consisting of tetravalent vanadium, titanium and zirconium halides and in the presence of at least one activator for said halide catalyst comprising a reaction product of $BF_3$ with a compound selected from the group consisting of aluminum hydroxide and magnesium hydroxide, the molar ratio of said halide catalyst to said activator ranging from $10^3$ to $10^{-3}$ part of halide catalyst to 1 part of activator.

## 4,025,403
## METHOD OF RADIATION POLYMERIZATION AND COPOLYMERIZATION OF ISOBUTYLENE BY A CATIONIC MECHANISM

Miroslav Marek; Ludek Toman, and Jan Pecka, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

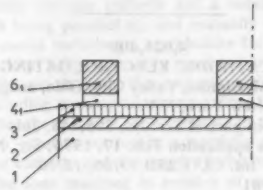
Division of Ser. No. 275,157, July 26, 1972, Pat. No. 3,897,322. This application Apr. 3, 1975, Ser. No. 564,603
Claims priority, application Czechoslovakia, July 29, 1971, 5555/71
Int. Cl.² C08D 1/00; C08F 1/16
U.S. Cl. 204—159.24 6 Claims

1. A method for the polymerization and copolymerization of mono-olefinic monomers polymerizable by a cationic mechanism, which comprises subjecting to a source of light selected from the group consisting of ultraviolet light, visible light, and infrared light at a temperature between about 0° C. and about −140° C. a polymerizable mixture selected from the group consisting of (a) isobutylene, and (b) mixtures of isobutylene with at least one diolefinic monomer selected from the group consisting of butadiene and isoprene in the presence of at least one halide catalyst selected from the group consisting of tetravalent vanadium, titanium and zirconium halides and in the presence of at least one activator for said halide catalyst selected from the group consisting of (i) an oxide, a hydroxide, an alkoxide and an aryloxide of a metal selected from the group consisting of (ii) copper, zinc, boron, aluminum, silicon, titanium, zirconium, vanadium, chromium, molybdenum, tugnsten, uranium, iron, cobalt and nickel, the molar ratio of said halide catalyst to said activator ranging from $10^3$ to $10^{-3}$ part of halidecatalyst to 1 part of activator.

## 4,025,404
## OHMIC CONTACTS TO THIN FILM CIRCUITS

Jean Joly, and Jean Bernard Ranger, both of Paris Cedex, France, assignors to Societe Lignes Telegraphiques et Telephoniques, Paris, France

Filed Nov. 4, 1975, Ser. No. 628,846
Claims priority, application France, Nov. 6, 1974, 74.36805
Int. Cl.² C25D 5/00; C23C 15/00; H01H 37/36
U.S. Cl. 204—38 B 6 Claims




1. process for establishing contact studs on thin film resistor circuits coated on an insulating substrate, which comprises:

cleaning said substrate.

depositing $Ta_2$ films thereon to constitute the circuit;

cathode sputtering a gold-platinum alloy layer on the surface of said films;

photoetching said gold-platinum layer through a mask protecting said stud locations;

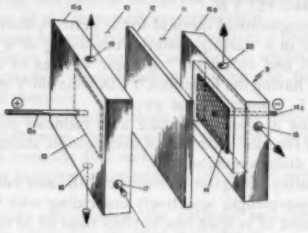
photoetching said thin film circuit through a photo mask and

removing said photo mask and electrolytically thickening said studs with gold.

## 4,025,405
## ELECTROLYTIC PRODUCTION OF HIGH PURITY ALKALI METAL HYDROXIDE

Ronald L. Dotson, Mentor, and Kevin J. O'Leary, Cleveland Heights, both of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Oct. 21, 1971, Ser. No. 191,424
Int. Cl.² C25B 1/16, 1/26, 13/08
U.S. Cl. 204—98 8 Claims

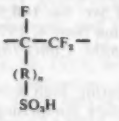


1. A process for the continuous production of alkali metal hydroxide substantially free from alkali metal halide and other impurities which comprises:

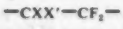
a. continuously providing an aqueous alkali metal halide solution to the anode compartment of an electrolytic cell in which a dimensionally stable anode and a cathode are maintained in separate anode and cathode compartments, respectively, by a stable, hydrated, cation selective, hydraulically impermeable, electrically conductive membrane interposed between said anode and said cathode;

b. electrolyzing the alkali metal halide solution while maintaining said solution at a temperature of from about 35° C. to about 100° C. and at a pH of about 1.0 to about 5.5, the sole source of water to the cathode compartment after startup being that transported through said membrane;

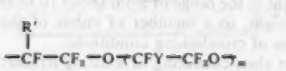
c. continuously removing alkali metal hydroxide solution, substantially free from alkali metal halide and other impurities, and hydrogen from the cathode compartment and halogen from the anode compartment; said membrane consisting essentially of a film of a fluorinated copolymer having pendant sulfonic acid groups or derivatives thereof and containing recurring structural units of the formula:


(1)

and


(2)

wherein R represents the group



in which R′ is fluorine or perfluoroalkyl of 1 to 10 carbon atoms, Y is fluorine or trifluoromethyl, and *m* is 1, 2 or 3, *n* is 0 or 1; X is fluorine, chlorine, hydrogen or trifluoromethyl; and X′ is X or $CF_3—CF_2—_z$ wherein *z* is 0 or an integer from 1 to 5; the units of formula (1) being present in an amount from 3 to 20 mole percent.

## 4,025,406
## PHOTOCHEMICAL METHOD FOR CHLORINE ISOTOPIC ENRICHMENT

**Michel Lamotte, Bordeaux, France; Harry J. Dewey, Salt Lake City, Utah; Richard A. Keller, Rockville, and Joseph J. Ritter, Mount Airy, both of Md., assignors to The United States of America as represented by the Secretary of Commerce, Washington, D.C.**

**Filed Jan. 28, 1976, Ser. No. 652,911**
**Int. Cl.² B01J** *1/10*
**U.S. Cl. 204—157.1 R** **10 Claims**

1. A photochemical method for selective chlorine isotopic enrichment in a starting material consisting of a mixture of chlorine-35 and chlorine-37 isotopic species of an isotopic compound having the formula CYClX wherein Y is O or S and X is Cl or F, comprising the steps of:

a. forming a gaseous mixture at a reduced pressure in a closed reaction chamber of said isotopic starting material and a dialkoxyethylene;

b. irradiating said gaseous mixture with laser radiation having a wavelength selectively coinciding with the absorption band of at least one but less than all of said chlorine isotopic species, thereby selectively exciting the irradiated isotopic species and causing it to preferentially react with said dialkoxyethylene to form a stable reaction product which is readily separable from the reaction mixture;

c. continuing said irradiation of said gaseous mixture for a period of time sufficient to form a significant amount of said reaction product in said reaction chamber; and

d. recovering from the remaining gaseous phase in said reaction chamber unreacted isotopic starting material selectively enriched in the unirradiated chlorine isotopic species.

## 4,025,407
## METHOD FOR PREPARING HIGH SOLIDS FILMS EMPLOYING A PLURALITY OF CURING MECHANISMS

**Wen-Hsuan Chang, and Marco Wismer, both of Gibsonia, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 140,578, May 5, 1971, abandoned. This application Nov. 4, 1974, Ser. No. 520,767**
**Int. Cl.² C08F** *8/00*; **C08G** *18/00, 63/00*
**U.S. Cl. 204—159.14** **15 Claims**

1. A method for preparing high solids films comprising subjecting a film of a mixture comprising

a. a radiation sensitive liquid material; and

b. a radiation insensitive thermosetting resin wherein said radiation sensitive liquid material is present in said mixture in an amount in the range of from about 20 to about 90 percent by weight and wherein said radiation insensitive thermosetting resin is present in said mixture in an amount in the range of from about 10 to about 80 percent by weight, to a member of either of the following two classes of crosslinking conditions:

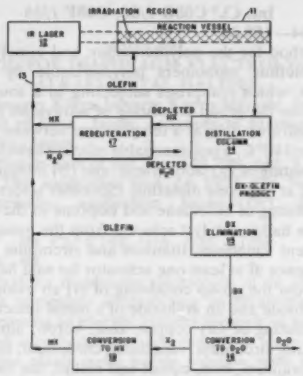
c. a first class consisting of ionizing irradiation and actinic light, or

d. a second class consisting of oxidation, moisture and heating to partially cure said mixture and subsequently completely curing the remainder of said mixture by subjecting said partially cured mixture to a member of the other of said clases of curing conditions to form a film which is flexible and abrasion resistant.

## 4,025,408
## DEUTERIUM SEPARATION BY INFRARED-INDUCED ADDITION REACTION

**John B. Marling, Livermore, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed May 28, 1976, Ser. No. 691,258**
**Int. Cl.² B01J** *1/10*; **B01D** *59/34*
**U.S. Cl. 204—163 R** **16 Claims**




1. A method for separating isotopes of hydrogen which comprises:

providing a gaseous mixture comprising a hydrogen halide in which hydrogen is present in a plurality of isotopes and an unsaturated aliphatic compound characterized by an activation energy for ground state hydrogen halide addition of less than about 40 Kcal/mole;

subjecting said mixture to radiation at a predetermined photon energy to excite those molecules of hydrogen halide containing a desired isotope of hydrogen to a predetermined vibrational energy level corresponding to said predetermined photon energy without substantially exciting those molecules of hydrogen halide containing an undesired isotope of hydrogen, the excited molecules thereby preferentially reacting with said unsaturated aliphatic compound by an addition reaction to produce an addition product enriched in the desired isotope; and

separting the resulting addition product enriched in the desired isotope from the reaction mixture.

## 4,025,409
## DUAL CURE CATHODIC ELECTROCOATING PROCESS

**Vincent Daniel McGinniss, Valley City, Ohio, assignor to SCM Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 595,448, July 14, 1975, abandoned. This application Feb. 17, 1976, Ser. No. 658,269**
**Int. Cl.² C25D** *13/06, 13/10*
**U.S. Cl. 204—181** **8 Claims**

1. In a process for electrodeposition from an aqueous electrocoating bath of an electrocoating composition onto a cathode substrate disposed within said bath, said electrocoating composition containing a polymer having pendant mercaptan groups and a polymer having pendant tertiary amine groups in combination with a cross-linking agent in an aqueous dispersion in said bath, said electrocoating composition being cross-linkable upon subsequent curing of the electrocoating on said cathode substrate, the improvement which comprises:

a. providing said electrocoating composition containing

1. a polymer having at least about 1% by weight pendant mercaptan groups, said mercaptan groups being protonated with acid to render said polymer water dispersible in said bath;

2. a polymer having at least about 1% by weight pendant tertiary amine groups, said pendant amine groups being attached to an alpha carbon of said polymer and said pendant amine groups being protonated with acid to render said polymer water dispersible in said bath;
3. at least about 5% bis-maleimide cross-linking agent by weight of said polymers; and
4. at least about 0.5% by weight of an ultraviolet photosensitizer by weight of said polymers;

said pendant tertiary amine groups and said pendant mercaptan groups together comprising at least about 5% by weight of both said polymers;

b. applying an electromotive potential through said bath to electrodeposit said polymers, said cross-linking agent and said photosensitizer onto said cathode substrate, said pendant mercaptan groups and said pendant tertiary amine groups becoming de-protonated thereby; and

c. curing said electrocoating on said cathode substrate by heat flowing-out said electroplated composition to cross-link said polymer having pendant mercaptan groups with said bis-maleimide by addition polymerization with said de-protonated pendant mercaptan groups, followed by irradiating with ultraviolet radiation said electrocoated composition to fully cure said electrocoating by free radical polymerization of said bis-maleimide with said alpha carbon of said tertiary amine groups.

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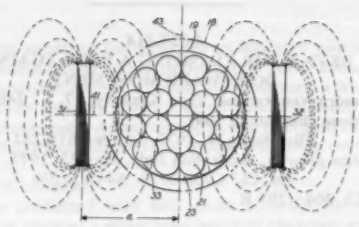
**4,025,410**

## SPUTTERING APPARATUS AND METHODS USING A MAGNETIC FIELD

**William W. Stewart, Allentown, Pa., assignor to Western Electric Company, Inc., New York, N.Y.**

**Filed Aug. 25, 1975, Ser. No. 607,536**
**Int. Cl.² C23C *15/00***
**U.S. Cl. 204—192 R** **3 Claims**



1. A method of sputtering in an evacuable chamber between a substantially circular cathode and a substantially circular anode each being parallel to, and mutually spaced from the other, the anode including a workholder facing the cathode, the workholder being rotatably mounted with respect to a longitudinal axis through the cathode and the anode, the method including causing an electron flow from the cathode to the anode, the electron flow resulting in the generation of ions from a gaseous source in a partially evacuated space between the cathode and the anode, bombarding of the cathode with the ions resulting in erosion of material from the cathode and deposition of at least some of the material on workpieces located on the workholder at the anode, wherein the improvement comprises:

maintaining a magnetic field within the chamber, the field being associated with at least one permanent magnet, the magnet being located within the chamber centered in a plane parallel to and between the planes of the anode and the cathode , and positioned outside of the space between the anode and the cathode, a portion of said magnetic field passing substantially laterally through at least one peripheral segment of the space between the cathode and the anode and decreasing in strength in a radially inward direction toward the longitudinal axis through the cathode and the anode, the magnetic field increasing the length of the path of the electrons to increase the generation of ions in the space of the peripheral segment of the magnetic field between the cathode and the anode, the increased ion generation resulting in an increased material deposition rate on workpieces located within the segment with respect to workpieces located adjacent such segment; and

rotating the workholder about the longitudinal axis, and exposing all workpieces located near the periphery of the workholder to such increases in the material deposition rate as the workholder moves the workpieces through the segment of the increased ion generation.

2. Apparatus for sputtering a material from a first surface to coat workpieces located on a second surface which comprises:

a substantially circular cathode having the first surface located thereon;

a substantially circular anode having the second surface located thereon, the second surface being parallel to and spaced from the first surface;

means for locating workpieces on the second surface of the anode;

an enclosure surrounding the cathode and the anode to form an evacuable chamber thereabout;

means for evacuating the chamber;

means for introducing an ionizable gaseous substance into the space between the cathode and the anode;

means for applying an electrical potential across the anode and the cathode;

at least one permanent magnet located within the chamber centered in a plane parallel to and between planes wherein the anode and the cathode are located, the magnet being positioned outside of the space between the cathode and the anode, for generating at least one lateral magnetic field, the field extending substantially parallel to the first and second surfaces of the cathode and of the anode into at least one peripheral segment of the space between the cathode and the anode, the field having a decreasing strength in a direction toward the center of the anode throughout a major portion of the segment; and

means for rotating the anode with respect to the cathode and the peripheral segment about a central longitudinal axis through the cathode and the anode, thereby exposing the workpieces located near the periphery of the anode equally to the increased magnetic field in the space between the cathode and the anode, and to a correspondingly increased sputter deposition of material on such workpieces.

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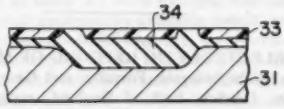
**4,025,411**

## FABRICATING SEMICONDUCTOR DEVICE UTILIZING A PHYSICAL ION ETCHING PROCESS

**Yoshio Hom-Ma, Kokubunji, and Tadao Kaji, Tokyo, both of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Oct. 28, 1975, Ser. No. 626,277**
**Claims priority, application Japan, Oct. 25, 1974, 49-122559; Oct. 18, 1975, 50-125752**
**Int. Cl.² H01L *21/312***
**U.S. Cl. 204—192 E** **16 Claims**




1. A method for fabricating a semiconductor device comprising the steps of:

applying a layer of liquid material to an uneven surface of a substrate to a thickness sufficient to form an even-surfaced layer covering the uneven surface of said substrate;

converting said layer of liquid material to a layer of solid

material which has about the same etching rate with respect to a physical etching utilizing ions as the material composing the surface of said substrate; and

etching said layer of solid material and the surface of said substrate covered thereby with said physical etching utilizing ions, so as to expose a predetermined portion of the surface of said substrate.

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**4,025,412**

**ELECTRICALLY BIASED TWO ELECTRODE, ELECTROCHEMICAL GAS SENSOR WITH A $H_2$ COUNTER/REFERENCE ELECTRODE INCORPORATING A HYDROGEN STORAGE BUFFERING SYSTEM**

**Anthony B. LaConti, Lynnfield, Mass., assignor to General Electric Company, Wilmington, Mass.**

**Filed Dec. 4, 1975, Ser. No. 637,518**

**Int. Cl.² G01N *27/52***

**U.S. Cl. 204—195 R** **9 Claims**

1. An electrochemical gas detector comprising an ion transporting electrolyte means, a catalytic sensing electrode positioned on one side of said electrolyte means, a counter/reference catalytic electrode positioned on the other side of said electrolyte means, means for applying a voltage between said electrodes to maintain the potential at said sensing electrode equal to or in excess of the potential required to oxidize the gaseous constituent to be detected, means for exposing the sensing electrode to the gaseous constituent to be detected to oxidize said constituent and produce hydrogen ions at said sensor electrode for transport across said electrolyte to said counter/reference electrode to produce molecular hydrogen there, means to maintain a constant reference potential at said counter/reference electrode including means to store the molecular hydrogen produced at said counter/reference electrode to maintain a substantially constant hydrogen partial pressure and a constant reference potential at said counter/-reference electrode.

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**4,025,413**

**ELECTROLYTIC REFINING OF METAL**

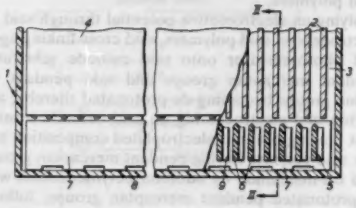
**Colin Walter Nightingale, Formby, and Georg Paul Richard Bielstein, London, both of England, assignors to British Copper Refiners Limited, Prescot, England**

**Division of Ser. No. 396,550, Sept. 12, 1973, Pat. No. 3,928,151. This application June 23, 1975, Ser. No. 589,353**

**Int. Cl.² C25C *1/12, 7/00***

**U.S. Cl. 204—252** **13 Claims**

1. Apparatus for electrolytically refining copper by the series process comprising a tank having an inner surface of an electrically insulating synthetic polymeric material that is substantially insert to an electrolyte solution to be contained in the tank and, associated with the tank, baffles for substantially reducing current flow that would otherwise occur around at least some of the edges of electrodes when immersed in the electrolyte solution, which baffles comprise sheets of an electrically insulating material that is substantilly inert to the electrolyte solution, wherein said baffles include a pair of side baffles of such a shape and size that each can be positioned between side edges of electrodes when immersed in the tank and a neighbouring side wall of the tank throughout substantially the whole length of a group of electrodes with its



major surfaces substantially vertical, and a plurality of bottom baffles in the form of a self-supporting lattice-work structure, the bottom baffles being so arranged and of such a shape and size that, when the lattice-work structure resets on the base of the tank, the bottom baffles will be mutually spaced along the length of the tank and will be positioned with their major surfaces substantially vertical in the gap between the base of the tank and the bottom edges of electrodes when immersed in the tank, with each bottom baffle extending transversely of those walls of the tank which will be adjacent the side edges of the electrodes throughout at least substantially the whole of the width of the electrodes.

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**4,025,414**

**DEVICE FOR CLAMPING A BODY AGAINST DOWNWARD MOVEMENT**

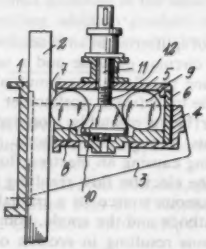
**Alessandra Vendramini, Viale Kennedy, 17, I - 24020 Torre Boldone (Bergamo), Italy**

**Filed Sept. 30, 1975, Ser. No. 618,232**

**Claims priority, application Italy, May 23, 1975, 2913/75**

**Int. Cl.² C23B *5/70;* A44B *21/00***

**U.S. Cl. 204—297 R** **7 Claims**



1. An assembly for holding a structure against downward movement, comprising means providing an upright surface against which the structure is adapted to be pressed, bracket means fixedly carried by said means which provides said upright surface, said bracket means having spaced from said upright surface a blocking surface which faces said upright surface, expandable clamping means supported by said bracket means and expanding means cooperating with said expandable clamping means for expanding the latter into a clamping position pressing against said blocking surface of said bracket means and against a surface of a structure situated against said upright surface, said expandable clamping

means including an element adapted to press against said structure while having frictional rolling contact therewith, said element having, for engagement with said structure, a convex surface which is curved around a horizontal axis, and said clamping means automatically responding to the tendency of said element to be rolled by said structure, when the latter tends to move downwardly, for increasing the dimension of said clamping means between said blocking surface and said upright surface, whereby the clamping force will automatically tend to increase with any tendency of the structure to move downwardly with respect to said upright surface.

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**4,025,415**

## APPARATUS FOR PREPARING AN ELECTROCOATED PRODUCT

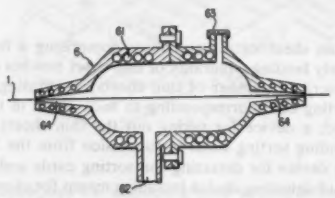
**Kyoichi Shibayama; Fumihiko Sato, and Takashi Takahama, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 564,908, April 3, 1975. This application Aug. 5, 1976, Ser. No. 711,816**

**Claims priority, application Japan, Apr. 30, 1974, 49-49012; Apr. 30, 1974, 49-49013**

**Int. Cl.² C25D** *13/16, 17/00*

**U.S. Cl. 204—300 EC** **2 Claims**




1. In an apparatus for preparing an insulated wire by electrodeposition having an electrodeposition vessel containing a water dispersion varnish, a boiling water bath and a drying and curing oven through which a metal wire is passed, an improved compressed steam treating device interposed between said boiling water bath and said drying and curing oven, comprising:

a steam chamber;

means connected with said steam chamber for heating steam therein; a steam inlet into said chamber; and,

inlet and outlet nozzles formed at opposite ends of said steam chamber for passage therethrough of said wire and for discharging said heated and compressed steam.

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**4,025,416**

## SHALE RETORTING PROCESS

**Roland F. Deering, Brea; Roland O. Dhondt, Long Beach, and Thomas A. Seesee, Newport Beach, all of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.**

**Filed Dec. 18, 1975, Ser. No. 642,151**

**Int. Cl.² C10G** *1/02*

**U.S. Cl. 208—11 R** **26 Claims**

1. In a shale retorting process wherein a vertically moving compact bed of crushed oil shale is countercurrently contacted in a retorting zone with a preheated eduction gas to thereby educe oil and product gases from said shale, a portion of said product gases being recycled as said eduction gas, and wherein a temperature gradient is thereby established in said retorting zone including a maximum temperature between about 900° – 1100° F at the solids outlet end of said retorting zone, and an intermediate temperature of 800° F between the two extremities of said retorting zone, and wherein the oil assay of shale fed to said retorting zone varies susbstantially from time to time, the improved method for preventing agglomeration of said crushed shale at any point in said bed, which comprises correlating the inlet temperature of said eduction gas with the flow rate thereof in response to the oil assay of said shale, so as to shift said intermediate temperature downwardly in said bed when said oil assay declines, and upwardly in said bed when the oil assay increases, whereby the rock pressure bearing on said intermediate temperature zone is at all times insufficient to bring about significant shale agglomeration.

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**4,025,417**

## HYDROPROCESSING CATALYTIC CRACKING FEED STOCKS

**Robert T. Pavlica, Cherry Hill, N.J., assignor to Mobil Oil Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 469,170, May 13, 1974, abandoned. This application May 19, 1975, Ser. No. 578,443**

**Int. Cl.² C10G** *37/06*

**U.S. Cl. 208—57** **5 Claims**

1. In a process for producing gasoline and fuel oil cracked products by catalytically cracking a hydrocarbon blend comprising a major fraction of virgin gas oil and a minor fraction of coker gas oil, said coker gas oil having an aromatic carbon content greater than 35%, said process comprising blending said virgin gas oil and said coker gas oil to form said blend; cracking said blend under cracking conditions in the absence of added hydrogen with a catalyst comprising a crystalline aluminosilicate zeolite; and recovering said cracked products, the improvement, whereby increasing the yield of said cracked products, which comprises:

mildly hydroprocessing said minor fraction of coker gas oil in the presence of hydrogen and a hydroprocessing catalyst, said hydroprocessing being conducted at a temperature of 550° F to 800° F, a pressure of 300 to 3000 p.s.i.g., and at a LHSV of 0.25 to 4.0; recovering a hydroprocessed coker gas oil having at least 600 ppm total nitrogen and an aromatic carbon content of about 20% to less than 35%; and blending said recovered hydroprocessed coker gas oil with an major fraction of said virgin gas oil prior to said cracking step.

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**4,025,418**

## HYDROCARBON CONVERSION WITH AN ACIDIC SULFUR-FREE MULTIMETALLIC CATALYTIC COMPOSITE

**George J. Antos, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.**

**Continuation-in-part of Ser. No. 550,083, Feb. 14, 1975, Pat. No. 3,939,059. This application Feb. 10, 1976, Ser. No. 656,925**

**The portion of the term of this patent subsequent to Feb. 17, 1993, has been disclaimed.**

**Int. Cl.² C10G** *35/08;* **B01J** *27/06*

**U.S. Cl. 208—139** **26 Claims**

1. A process for converting a hydrocarbon which comprises contacting the hydrocarbon at hydrocarbon coversion conditions with an acidic sulfur-free catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt.% platinum group metal, about 0.1 to about 5 wt.% cobalt, about 0.01 to about 2 wt.% rhenium, and about 0.1 to about 3.5 wt.% halogen; wherein the platinum group metal, catalytically available cobalt, and rhenium are uniformly dispersed throughout the porous material; wherein substantially all of the platinum group metal is present in the elemental metallic state; and wherein substantially all of the rhenium and catalytically available cobalt are present in the elemental metallic state or in state which is reducible to the elemental metallic state under hydrocarbon conversion conditions or in a mixture of these states.

23. An acidic sulfur-free catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt.% platinum group metal, about 0.1 to about 5 wt.% cobalt, about 0.01 to abou 2 wt.% rhenium, and about 0.1 to about 3.5 wt.% halogen; wherein the plati-

num group metal, catalytically available cobalt, and rhenium are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum group metal is present in the elemental metallic state; and wherein substantially all of the rhenium and catalytically available cobalt are present in the elemental metallic state or in a state which is reducible to the elemental metallic state under hydrocarbon conversion conditions or in a mixture of these states.

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**4,025,419**

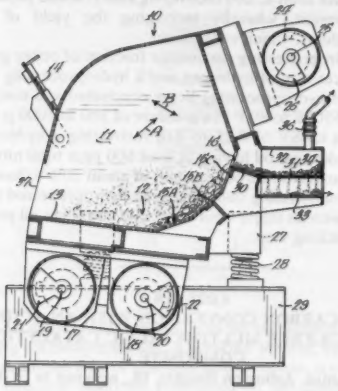
**VIBRATORY SAND RECLAIMING APPARATUS**

**Albert Musschoot, Barrington, Ill., assignor to General Kinematics Corporation, Barrington, Ill.**

**Continuation of Ser. No. 488,743, July 15, 1974, abandoned. This application Aug. 29, 1975, Ser. No. 609,108**

**Int. Cl.² B24B** *31/06, 31/14;* **B07B** *1/30*

**U.S. Cl. 209—3** **2 Claims**



1. Apparatus for reclaiming foundry sand from lumps of previously used foundry sand comprising, means forming a closed chamber, a floor in the chamber having a portion slanting upwardly from the horizontal, an exit from the chamber at the upper end of the slanting portion of the floor, an entrance to the chamber to permit the introduction of lumps of sand thereinto, means supporting the chamber for vibratory movement, means for vibrating the chamber along a line inclined to the horizontal to convey material in the chamber toward said exit and to agitate the lumps and cause them to abrade adjacent lumps to remove discrete particles of sand therefrom, said discrete particles of sand accumulating on the floor and increasing in volume as vibration continues until the volume is sufficient to reach the level of the exit, means for modifying the vibrating of the chamber to cause the chamber to vibrate along a line inclined from the horizontal and extending oppositely to said first line to convey materials on the floor toward said entrance, a screen carried by the chamber forming means exteriorly thereof and positioned to receive sand and other material discharged from the exit, a material supporting floor below the screen and carried by the chamber forming means, said screen permitting discrete particles of sand to pass therethrough onto the material supporting floor while prohibiting the passage of larger particles, and means for directing said larger particles to one area and for delivering the sand particles to another area.

**4,025,420**

**THIN-SHEET-SORTING APPARATUS**

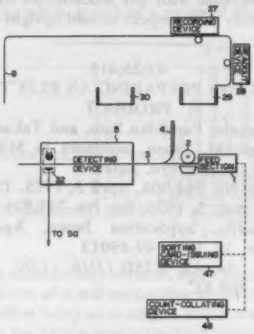
**Shigeo Horino, Tokyo, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan**

**Filed Sept. 24, 1974, Ser. No. 508,908**

**Claims priority, application Japan, Sept. 28, 1973, 48-109017**

**Int. Cl.² B07C** *5/10;* **G65H** *7/12*

**U.S. Cl. 209—74 R** **15 Claims**




1. A thin sheet-sorting apparatus comprising a feeder for successively feeding a plurality of thin sheet batches comprising a prescribed number of thin sheets constituting a batch and a sorting card corresponding to each batch in the order mentioned; a device for taking out the thin sheets and the corresponding sorting cards in succession from the feeder; a detecting device for detecting the sorting cards and the thin sheets, said detecting device including means for classifying fit thin sheets, unfit thin sheets and sorting cards from the taken out thin sheets; means for separately stacking the thin sheets into a first group of fit thin sheets and a second group consisting of unfit thin sheets and sorting cards in accordance with the output of said detecting device, said separately stacking means comprising a first sorting gate for dividing the thin sheets and sorting cards into a first group consisting of fit thin sheets and a second group consisting of unfit thin sheets and sorting cards, a second sorting gate for dividing the fit thin sheets into normal and soiled thin sheets, a recording device for recording on each sorting card the total number of said fit thin sheets in the corresponding batch.

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**4,025,421**

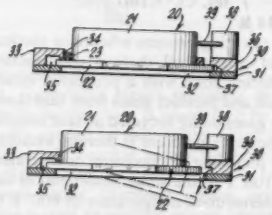
**GASKET INSPECTION METHOD**

**Hugo Mueller, Livingston, N.J., assignor to American Flange & Manufacturing Co., Inc., Linden, N.J.**

**Filed Nov. 28, 1975, Ser. No. 635,792**

**Int. Cl.² B07C** *5/06*

**U.S. Cl. 209—85** **7 Claims**



1. A method of inspecting closure flanges having an upstanding cylindrical neck surrounded by a laterally extending base and an annular sealing gasket seated at the juncture of

the neck and base, comprising the steps of conveying flanges longitudinally through an inspection station, sensing the presence and proper positioning of said gasket at said inspection station, restraining properly gasketed flanges against lateral movement at said station permitting said properly gasketed flanges to pass therethrough, allowing improperly gasketed flanges to move laterally at said inspection station and ejecting said improperly gasketed flanges in response to said lateral movement.

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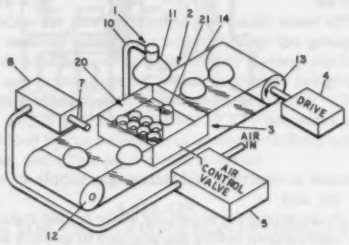
## 4,025,422
## METHOD AND APPARATUS FOR INSPECTING FOOD PRODUCTS

**Arnold O. Malvick, Manteca, and Wayne W. MacDonald, Oakdale, both of Calif., assignors to Tri/Valley Growers, San Francisco, Calif.**

**Filed Aug. 14, 1975, Ser. No. 604,596**
**Int. Cl.² B07C 5/34**
**U.S. Cl. 209—111.5** **6 Claims**




1. An apparatus for inspecting food products for defects, comprising:

means for transmitting radiation through said food products including means for transporting food products through said radiation and including a pair of endless belts and means having a planar surface substantially transparent to said radiation located in a position intermediate said pair of belts in contiguous relation therebetween; and

means responsive to a predetermined reduction of radiation transmitted through any one of a large plurality of segments of each food product for segregating said defective food product from the undefective food products.

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## 4,025,423
## PROCESS FOR REMOVING MONOHYDRIC AND POLYHYDRIC PHENOLS FROM WASTE WATER

**Hans Martin Stönner, Schwalbach, and Paul Wiesner, Oberursel, both of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany**

**Filed Jan. 9, 1976, Ser. No. 647,968**
**Claims priority, application Germany, Jan. 15, 1975, 2501376**
**Int. Cl.² B01D 11/04**
**U.S. Cl. 210—21** **7 Claims**

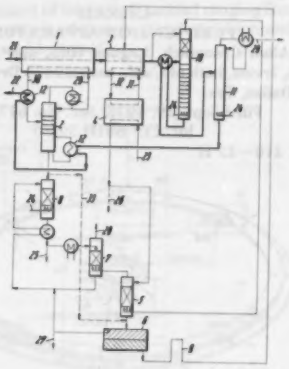
1. Process for removing monohydric and polyhydric phenols, hydrogen sulfide, free and combined ammonia by extraction and distillation from waste water formed during the degasification or gasification of coal and subsequently subjected to biological purification, which process comprises:

a. removing a major portion of the monohydric phenol, part of the polyhydric phenols and a portion of any of the free fatty acids present in the waste water by extraction with a small amount of a non-saponifying organic solvent having a boiling point below 100° C, thereby forming a first extract phase and a first refined phase;

b. separating the phenols from said first extract phase by distillation whereby said organic solvent is distilled off;

removing a major portion of the polyhydric phenols the remainder of the monophenols and an additional amount of any free fatty acids which may be present by a single or repeated extraction with a larger amount of the same organic solvent employed in step (a) from said first refined phase obtained from step (a), thereby forming a second extraction phase and a second refined phase;

d. separating said second extraction phase from said second refined phase and transforming the phenols in said second extraction phase obtained from step (c) to their salts by treating with an aqueous alkaline solution and separating the so-treated mixture into an organic phase and an aqueous phase;



e. recycling the solvent-containing organic phase from step (d) to step (c);

f. recovering the free phenols from the aqueous phase from step (d) by contacting the same with an amount of $CO_2$ obtained by atmospheric or superatmospheric deacidification of said second refined phase with simultaneous stripping of the remaining solvent and $H_2S$, thereby forming an alkali carbonate;

g. separating the free phenols from said alkali carbonate;

h. contacting said first refined phase with said alkali carbonate to liberate $NH_3$; and

i. jointly stripping off said liberated $NH_3$ with any $NH_3$ with

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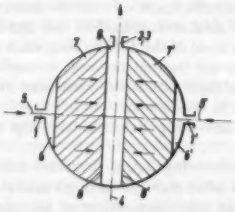
## 4,025,424
## PROCESS AND APPARATUS FOR LIQUID-LIQUID COUNTERFLOW EXTRACTION

**Horst Ludwig Reichhardt, Frankfurt am Main; Eckart Müller, Bergen-Enkheim, and Helmut Markwort, Weisskirchen, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany**

**Filed Oct. 5, 1974, Ser. No. 521,123**
**Claims priority, application Germany, Nov. 16, 1973, 2357201**
**Int. Cl.² B01D 21/10**
**U.S. Cl. 210—23 R** **3 Claims**



1. In a process for liquid-liquid counterflow separation based on the mixer-separator principle wherein a dispersion of two liquid phases is fed to a separator which separates the

mixture of the two phases in natural gravitational field, said separator being equipped with separator chambers containing sharp edge turnings consisting of stainless steel and clear phases are withdrawn from said separator, the improvement which comprises feeding the dispersion to be separated to the side of a cylindrical separator having a vertical axis in two partial streams equal in rate of flow, the partial streams flowing through the separator in mutually opposite directions and along respective paths each having a length equal to one-half of the diameter of the separator.

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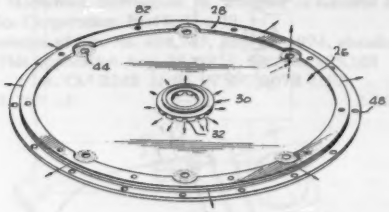
**4,025,425**

## PURIFICATION APPARATUS

**Gerald Allan Croopnick, Laguna Hills, and John Mark Michaels, Irvine, both of Calif., assignors to Dresser Industries, Inc., Dallas, Tex.**

**Filed Sept. 29, 1975, Ser. No. 617,683**
**Int. Cl.² B01D** *59/10*
**U.S. Cl. 210—23 H** **18 Claims**




1. Separation apparatus for receiving a feed fluid and for separating permeate from rejectant of the feed fluid, comprising:

a plurality of membrane packs arranged in a stack with the packs spaced from one another, each pack having a pair of membranes on either face thereof for passing permeate while preventing the passage of rejectant;

each of said packs having at least one exit hole extending therethrough, with the exit hole spaced from the center of the pack and projecting through both membranes of the pack, and said packs being arranged with their exit holes substantially aligned to form a pipe-like manifold for carrying away concentrate.

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**4,025,426**

## APPARATUS AND METHOD USING ACTIVATED CARBON TO PURIFY LIQUID WASTES

**Richard J. Anderson, and Richard B. Leon, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jan. 15, 1975, Ser. No. 541,168**
**Int. Cl.² B10D** *15/06*
**U.S. Cl. 210—25** **9 Claims**

1. An apparatus using activated carbon to remove impurities from liquid comprising:

an adsorption column comprising a vertical stack of at least two containers, each of said containers being partially filled with an activated carbon bed and having an opening above the level of the carbon bed, each of said containers having, in the bottom thereof, means for providing the passage of liquid from the container into the next lower container in said stack;

means for delivering liquid to the top container of said stack;

means for removing liquid from the bottom container of said stack after passage through said stack; and

means for in situ reactivation of the carbon, said means comprising:

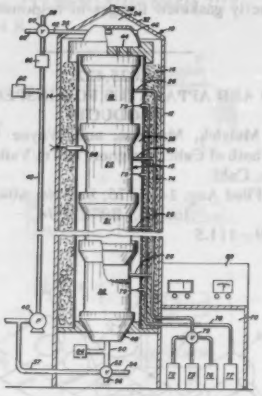
an outer housing spaced from and enclosing said stack;

a steam supply;

means for connecting said steam supply to each said opening of said containers so as to make steam available for the activation of the carbon;

a burner gas supply;

at least one burner jet located within the space between said outer housing and said stack;



means connecting said burner gas supply to said burner jet; and

a water supply for supplying water to said column to rinse said column before heating and to quench said column after heating.

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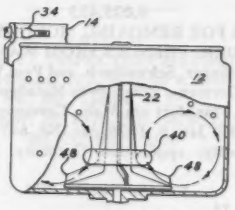
**4,025,427**

## REUSABLE WATER SOFTENER SYSTEM FOR CLOTHES WASHER

**Leopold Loeb, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.**

**Division of Ser. No. 417,364, Nov. 19, 1973, Pat. No. 3,937,042. This application July 16, 1975, Ser. No. 596,357**
**Int. Cl.² B01D** *15/06;* **C02B** *1/42*
**U.S. Cl. 210—33** **3 Claims**




1. The method of softening water for a clothes washer having a tub, an agitator, a pump to draw liquid from the tub, and a conduit connected to the pump for selectively returning liquid to the tub comprising the following steps;

a. placing a package of cation exchange resin, the package being permeable to water, into the tub and around the agitator,

b. introducing water into the tub,

c. operating the agitator and pump whereby water will be circulated through the resin by means of said pump and conduit for removing calcium and magnesium ions from the water to effect a reduction of hardness of the water,

d. removing the package of cation exchange resin from the tub,

e. placing the package of cation exchange resin in a container,

f. supplying regenerating solution to the container to immerse the package and at a rate sufficient to effect replacement of calcium ions on the resin by sodium ions, and

g. removing the solution carrying evolved calcium ions from the container while maintaining the package immersed.

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## 4,025,428
## PROCESS FOR THE PURIFICATION OF INDUSTRIAL EFFLUENTS

**Hans Wegmuller, Riehen, and Jaroslav Haase, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Division of Ser. No. 356,853, May 3, 1973, abandoned. This application May 7, 1975, Ser. No. 575,279**

**Claims priority, application Switzerland, May 10, 1972, 007012/72**

**Int. Cl.² C02B *1/60*; C02C *5/08***

**U.S. Cl. 210—36** **10 Claims**

1. A process for purifying industrial waste water effluents containing residual substances selected from the group consisting of dyestuffs, optical brighteners, dyeing auxiliaries, detergents and tanning agents, which comprises bringing said effluents into contact with a cellulosic absorbent which is pretreated with a polymer associate of (1) polyamidopolyamines produced by condensation of a polymeric fatty acid and a polyamine, and (2) a polyanionic polymer.

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## 4,025,429
## PROCESS FOR THE PURIFICATION OF INDUSTRIAL EFFLUENT

**Heinz Neuschütz, Grenzach, Germany, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation of Ser. No. 372,438, June 19, 1973, abandoned. This application Sept. 19, 1975, Ser. No. 615,133**

**Claims priority, application Switzerland, July 23, 1972, 9527/72**

**Int. Cl.² C02B *1/20***

**U.S. Cl. 210—52** **5 Claims**

1. A process for the purification of aqueous effluent which results in the textile, paper and leather industries and in the manufacture of dyestuffs and optical brighteners, and which contain water-soluble, anionic dyestuffs or optical brighteners, said process comprising mixing said effluent with a water-soluble condensation product from dicyandiamide, formaldehyde, ethylene diamine and ammonium chloride in a ratio of 2.2 moles of formaldehyde, 1.3 moles of ethylene diamine and 0.8 moles of ammonium chloride per mole of dicyandiamide, in an amount corresponding to 0.03 to 3 grams of said condensation product per gram of dyestuff and optical brightener, and the subsequent removal of the occurring flocculate from the effluent.

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## 4,025,430
## REMOVAL OF METAL IONS FROM WASTE WATER

**Richard F. Pagel, Belleville, Ill., assignor to Amax Inc., New York, N.Y.**

**Filed Jan. 12, 1976, Ser. No. 648,289**

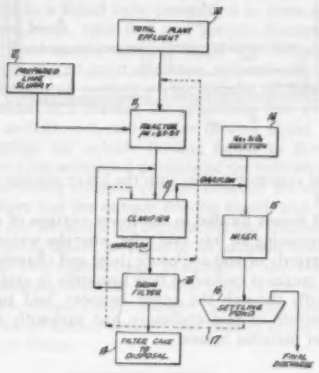
**Int. Cl.² C02C *5/02***

**U.S. Cl. 210—53** **2 Claims**

1. A method of treating an acid aqueous effluent of pH less than 4 obtained in the hydrometallurgy of zinc for removing metal ion impurities therefrom comprising the sequential steps of:

passing said aqueous effluent containing at least 20 ppm total of the metal ions Zn, Cd, Pb, Mn and Fe, each of said metal ions being present in amounts of at least about 2 ppm, said effluent also containing at least 1 ppm of the metal ions Mg, Ca, Hg, Na, K, Cu, Ni, Cr and As to a first reactor, preparing an amount of a lime slurry sufficient to neutralize said aqueous effluent and mixing an aliquot portion thereof comprising about 50% to 95% of said lime slurry with said aqueous effluent in a first stage treatment in said first reactor sufficient to raise the pH thereof to about 7 to 8 and precipitate metal hydroxides therein.

then in a second stage treatment passing said limewater-precipitate mixture to a second reactor to which the remainder of said lime slurry is added to provide a higher pH of about 8.5 to 9.5 effective to complete the precipitation of said metal hydroxides and provide an aqueous effluent containing residual metal ions other than Ca, Mg, Na and K ions selected from the group consisting of at least two elements of the group Zn, Cd, Mn, Hg and As, the total amount of lime (CaO) added ranging from about 5% to 20% excess of that required stoichiometrically to precipitate said hydroxides.




passing said reacted mixture to a clarifier to provide a thickened underflow of said metal hydroxide precipitate and an overflow of said aqueous effluent,

filtering said underflow of thickened precipitate to form a filter cake and recycling the filtrate thereof to said clarifier,

treating said overflow of aqueous effluent with an amount of sodium silicate solution corresponding to about 5 to 30 times that amount required stoichiometrically to remove said residual metal ions from solution as a precipitate,

adding a flocculating agent to agglomerate the precipitate formed,

disposing of said filter cake,

and passing said sodium silicate treated effluent to a settler, the overflow of said settler being discharged substantially free of said residual metal ion impurities.

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## 4,025,431
## APPARATUS FOR CLEANING AND AERATING WATER WITHIN AN AQUARIUM TANK

**Peter V. Saxton, Indianapolis, Ind., assignor to Indianapolis Center for Advanced Research, Inc., Indianapolis, Ind.**

**Filed Sept. 22, 1975, Ser. No. 615,777**

**Int. Cl.² B01D *23/24***

**U.S. Cl. 210—108** **6 Claims**

1. A filter for an aquarium tank comprising:

an enclosure constructed and arranged to be located at the bottom of an aquarium tank;

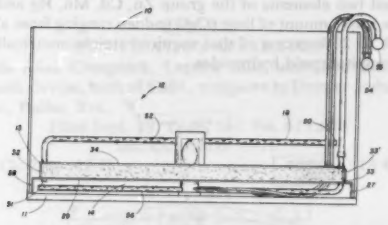
filter material means located along the upper portion of said enclosure and spaced above the bottom thereof;

an upstanding tube having a closed bottom and sidewalls, said tube having an open top, said tube being supported by said enclosure and extending upwardly above a top portion of said enclosure;

a chamber having a perforated top and further having sidewalls extending peripherally about the sidewalls of said

tube and spaced apart therefrom, the sidewalls of said chamber extending upwardly above the open top of said tube, the lower edge of the sidewalls of said chamber being spaced above the bottom of said enclosure to provide fluid communication between the space between said tube and said chamber and the underside of said filter material means;

a conduit having an inlet opening located exteriorly of said enclosure, tube and chamber and an outlet opening in



fluid communication with the lower portion of said tube; and

air lift means located in the lower portion of said tube for introducing air into said tube, whereby water drawn from exteriorly of said enclosure, tube and chamber by said air lift means is caused to flow upwardly in said tube, downwardly through the space between said tube and said chamber to said enclosure and upwardly through said filter material means.

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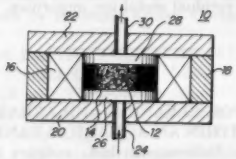
**4,025,432**

## FLOW CONTROL UNIT FOR MAGNETIC MATRIX

**John J. Nolan, Cambridge, and Peter G. Marston, Gloucester, both of Mass., assignors to Sala Magnetics, Inc., Cambridge, Mass.**

**Filed July 25, 1975, Ser. No. 599,099**
**Int. Cl.² B01D** *35/06*
**U.S. Cl. 210—222** **3 Claims**



1. A flow control unit for a magnetic matrix in a magnetic separator comprising:

at least one expander section, each said expander section including a channel element having at least one port, and a plurality of channels extending radially outwardly from each said port and terminating in a plurality of first holes; and

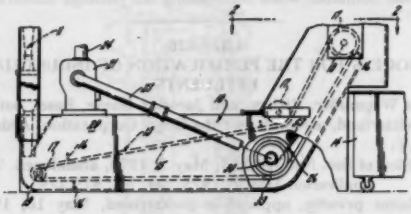
a spreader element including a plurality of second holes equal in number and aligned with said holes of the adjacent said expander section, a plurality of ducts associated with each of said second holes and a plurality of passages, one interconnecting each of said ducts with its respective one of said second holes.

**4,025,433**

## MAGNETIC SEPARATING APPARATUS

**Donald K. Greenberg, Rockford, Ill., assignor to Barnes Drill Co., Rockford, Ill.**

**Filed Jan. 22, 1976, Ser. No. 651,339**
**Int. Cl.² B01D** *35/06*
**U.S. Cl. 210—223** **9 Claims**



1. Apparatus for separating particles out of a flow of dirty liquid and for delivering a flow of cleaner liquid, said apparatus having a settling tank for receiving the flow of dirty liquid, and a pump having a suction line and a discharge line, the improvement in said apparatus comprising, an elongated pipe communicating with and rotatable relative to said suction line and submerged within said tank, said pipe being radially rigid and having a series of inlet openings extending along part of its length and spaced angularly around its periphery whereby liquid in said tank may be sucked radially through said openings and into said suction line, a series of plate-like permanent magnets rotatable with and spaced axially along said pipe adjacent said inlet openings with the poles of said magnetics facing axially to catch particles in the liquid flowing toward said openings, means for power rotating said pipe thereby to rotate said magnets in unison, and a scraper positioned within said tank for removing caught particles from said magnets and said pipe as an incident to rotation thereof, said scraper having surfaces located to scrape particles from at least one pole of each of said magnets and further having additional surfaces located to scrape particles from those surfaces of said pipe diposed between said magnets.

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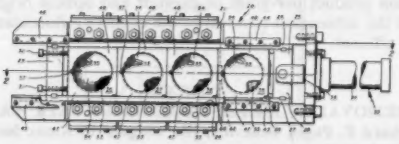
**4,025,434**

## SCREEN CHANGER WITH PRE-FILL SCREEN BLOCKS

**John Mladota, Lausanne, Switzerland, assignor to Bolton-Emerson, Inc., Lawrence, Mass.**

**Filed Oct. 6, 1975, Ser. No. 619,795**
**Int. Cl.² B01D** *27/00*
**U.S. Cl. 210—236** **10 Claims**



1. A screen changer for removing foreign matter from a flowable plastic advancing along a possage of an extruder, said screen changer being of the type having a plurality of screen blocks movable end-to-end along a rectilinear slideway, extending across said passage, by drive means to position said blocks individually and successively in operative screening position across said passageway and characterised by:

each said screen block having a planar rim encompassing a shallow filter recess, for receiving a filter, in the upstream face thereof, said filter covering a series of bores, the leading central portion of the planar rim of each successive screen having a pre-fill groove, extending in advance of the filter recess in the upstream face thereof for guiding said flowable plastic thereinto and through to the

downstream face thereof, prior to the arrival of said filter and bores at said passage under the motion imparted by said drive means;

whereby each individual and successive screen block is pre-filled with plastic while it is being moved into operative screening position.

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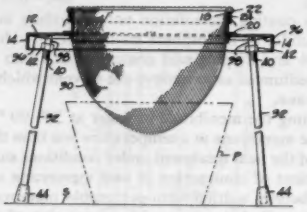
**4,025,435**

## PAINT FILTERING APPARATUS

**Dennis Owen Shea, 101 Carmel, No. 1, San Francisco, Calif. 94117**

**Filed July 25, 1975, Ser. No. 599,319**
**Int. Cl.² B01D** *35/28*
**U.S. Cl. 210—250** **8 Claims**



1. Apparatus for filtering paint comprising: a pail having a given diameter and a given height, a rigid impervious plate having length and width dimensions exceeding the given diameter, means for supporting said plate in parallel relation above a surface by a distance in excess of the given height, a central portion of said plate defining a circular opening having a diameter less than the given diameter and positioned directly above said pail, a generally cylindric rim having an outer diameter sized for entry into said opening, means protruding radially outward of said rim for bearing on said plate to retain said rim within said opening, said rim definging an exteriorly open annular groove therearound above said bearing means, a strap sized for entry in said groove, and means for tensioning said strip to retain the strap in said groove so as to retain a filter medium therein throughout the periphery thereof, said rim being smaller than the diameter of a paint bucket whereby said bucket can be rested on said rim in an inverted position.

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**4,025,436**

## LIQUID TREATMENT APPARATUS

**Nobuaki Tsuda; Kenji Inagaki; Tamotu Imamiya, all of Fuji; Kunio Ohno, Tokyo, and Yoshiyuki Mizoguchi, Ohita, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed Sept. 5, 1975, Ser. No. 610,829**
**Claims priority, application Japan, Sept. 7, 1974, 49-103127; Nov. 1, 1974, 49-132957**
**Int. Cl.² B01D** *31/00*
**U.S. Cl. 210—321 A** **14 Claims**

1. A liquid treatment apparatus which comprises

a. a vessel having a top and bottom face connected by a sidewall structure,

1. said top face having two spaced-apart openings,
2. said bottom face having at least one opening for introducing an outside flowing liquid,
3. an upper portion of said vessel, including said top face and part of said sidewall structure, having a plurality of openings for discharging said outside flowing liquid,
4. the interior of said vessel including a U-shaped passage, the terminal ends of which terminate at said two spaced-apart openings, respectively;

b. a bundle of semi-permeable hollow fibers substantially equal in length suspended within said U-shaped passage and occupying only a portion thereof,

1. one of the end portions of the bundle of fibers being gathered and bonded in a liquid tight connection to form a first fixation block and the other of the end portions of the bundle of fibers being gathered and bonded in a liquid tight connection to form a second fixation block, said first and second fixation blocks being fixed to said vessel, in liquid tight connection, at said two spaced-apart openings, respectively,
2. the unbonded portion of the bundle of fibers being suspended in a manner for permitting free expansion upon contact with said outside flowing liquid, thereby permitting the outside flowing liquid to flow freely between the unbonded portions of the individual fibers and providing intimate contact between the surface of the fibers and the outside flowing liquid; and

c. an inlet and an outlet for introducing and discharging an inside flowing liquid, arranged in an adjacent relationship with said two spaced-apart openings of the vessel and communicating with the terminal ends of the bundle of the fibers, respectively, thereby permitting the inside flowing liquid to flow through the interior of the individual hollow fibers.

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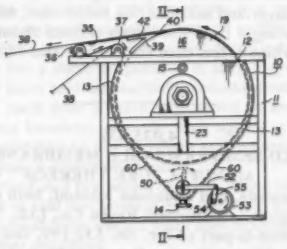
**4,025,437**

## ROTARY FILTER APPARATUS HAVING SLURRY AGITATOR

**Harry Ball, Piscataway, and James M. Stauffer, Moorestown, both of N.J., assignors to Technical Fabricators, Inc., Piscataway, N.J.**

**Filed Nov. 29, 1975, Ser. No. 644,907**
**Int. Cl.² B01D** *33/04*
**U.S. Cl. 210—383** **5 Claims**



1. A rotary filter capable of effectively filtering a slurry containing solid particles which tend to settle out of the slurry, comprising:

a tank for containing the flurry to be filtered, said tank having a pair of generally straight oppositely disposed wall surfaces inclined toward one another and tapered to meet at the bottom of the tank;

a rotary filter drum disposed within the tank and mounted for rotation about a horizontal axis parallel to said wall surfaces, said drum being immersible in said slurry so that a filter surface thereon contacts the slurry;

filtrate pump means to withdraw filtrate from the interior of said drum;

a rotatable shaft parallel to said wall surfaces and said drum

axis, said shaft being disposed within said tank adjacent the bottom thereof;

a single vane affixed to said shaft and extending upwardly therefrom, said vane extending substantially across the entire width of said tank in a direction parallel to said wall surfaces; and

means for imparting reciprocating motion to said shaft to reciprocate said vane at a rate sufficient to substantially preclude settlement of said particles out of said slurry.

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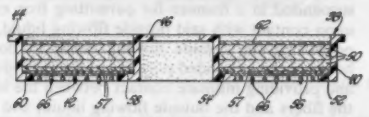
## 4,025,438
## WATER FILTER DEVICE

**Charles Gelman, and Attila Vadnay, both of Ann Arbor, Mich., assignors to Gelman Instrument Company, Ann Arbor, Mich.**

**Division of Ser. No. 516,322, Oct. 21, 1974, abandoned. This application Feb. 10, 1975, Ser. No. 548,654**

**Int. Cl.² B01D** *27/00*

**U.S. Cl. 210—484** **12 Claims**



**12.** A water filtering cartridge adapted to be removably received within an annular water filtering chamber of a water filtering device secured to the end of a faucet, said water filtering cartridge comprising an annular housing having inner and outer walls, said housing being open at one axial end thereof for reception of the water to be filtered and having at the other axial end thereof an annular wall with openings therein for exit of the water from said cartridge, an annular filtering layer in said housing adjacent the open axial end thereof comprising a fibrous material impregnated with particles of activated charcoal of a size of from about 5 to 50 microns, said filtering layer having a pore size of from about 20 to 50 microns, an annular filtering membrane adjacent said annular wall having a pore size of from about 0.2 to 0.5 microns, said filtering membrane being secured in sealed watertight relationship to the inner and outer walls of said housing, and an annular intermediate filtering layer between said first-mentioned layer and said filtering membrane, said intermediate layer having a pore size which is from about 1 to 10 microns and which is less than the particle size of said charcoal particles.

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## 4,025,439
## DRIED SEMIPERMEABLE MEMBRANE AND MANUFACTURE THEREOF

**Kensuke Kamada, and Shunsuke Minami, both of Otake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 532,159, Dec. 12, 1974, abandoned. This application Oct. 9, 1975, Ser. No. 621,076**

**Claims priority, application Japan, Dec. 12, 1973, 48-141465**

**Int. Cl.² B01D** *13/04*

**U.S. Cl. 210—500 M** **12 Claims**

**1.** In a process for preparing a dry semi-permeable membrane fabricated of polyacrylonitrile or a copolymer containing more than 65 weight % of acrylonitrile, the improvement which comprises:

contacting the polymer with a polar organic solvent selected from the group consisting of dimethylformamide, dimethylacetoamide, dimethylsulfoxide and mixtures thereof in a solids concentration of 15–30% by weight;

uniformly coating the solution onto a surface in a desired shape under an atmosphere having a relative humidity of 60–85% and dipping said coated surface into a non-solvent medium so as to remove the solvent which forms the membrane;

heat-treating the membrane in water at 50°–90° C; and

drying the membrane at a temperature less than the temperature of the heat treatment under conditions such that the coefficient of contraction of said membrane is less than 1%, whereby a dried semi-permeable membrane having an open celled structure with a pore size of diameter less than 0.5$\mu$ and a porosity of 0.40–0.7 is obtained.

**12.** A dry semi-permeable membrane prepared by a process, which comprises the steps of:

contacting polyacrylonitrile or a copolymer containing more than 65 weight % acrylonitrile with a polar organic solvent selected from the group consisting of dimethylformamide, dimethylacetoamide, dimethylsulfoxide and mixtures thereof in a solids concentration of 15–30% by weight;

uniformly coating the solution onto a surface in a desired shape under an atmosphere having a relative humidity of 60–85% and dipping said coated surface into a non-solvent medium so as to remove the solvent which forms the membrane;

heat-treating the membrane in water at 50°–90 ° C; and

drying the membrane at a temperature less than the temperature of the heat treatment under conditions such that the coefficient of contraction of said membrane is less than 1%, whereby a dried semi-permeable membrane having an open-celled structure with a pore size of a diameter less than 0.5$\mu$ and a porosity of 0.40–0.7 is obtained.

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## 4,025,440
## DEVICE FOR REGULATING A XENON LAMP WITH OPTICAL AND TEMPERATURE COMPENSATION

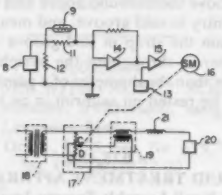
**Shigeru Suga, Yoyogi 5-20-2, Shibuya, Tokyo, Japan**

**Filed May 4, 1976, Ser. No. 683,216**

**Claims priority, application Japan, Sept. 30, 1975, 50-132980; Germany, Oct. 30, 1975, 2548635**

**Int. Cl.² G01J** *1/32*

**U.S. Cl. 250—205** **8 Claims**



**1.** A device for regulating the quantity of light emitted from a lamp in a lightfastness testing device, said device comprising:

a plurality of individually aluminum-coated glass rods bundled together, said bundled rods having a light-incident end adjacent said lamp and a light-receiving end opposite said light-incident end;

light-receiving means attached to said light-receiving end of said glass rods for receiving the light from said lamp transmitted through said glass rods and for generating a temperature adjusted voltage in response thereto, said light-receiving means comprised of:

a light-receiving element for generating a current in response to the light received from said lamp, and

a heat-sensitive resistance electrically connected to said light-receiving element for compensating for changes in the characteristics of said light-receiving element caused by temperature; and

electric circuit means having a reference voltage, said circuit means connected between said light-receiving means and said lamp for comparing the voltage generated by said light-receiving means with said reference voltage and for regulating the voltage to said lamp in response to the

difference between voltage generated by said light-receiving means and said reference voltage.

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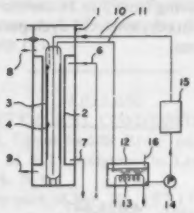
4,025,441

## OZONE GENERATING APPARATUS

Norikazu Tabata; Shigenori Yagi, and Takanori Ueno, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 11, 1975, Ser. No. 603,655
Claims priority, application Japan, Aug. 28, 1974, 49-99200; Nov. 5, 1974, 49-127405
Int. Cl.² C01B *13/11*
U.S. Cl. 250—540 10 Claims



1. An ozone generating apparatus comprising:

a high voltage electrode tube having an inner part, an inlet pipe and an outlet pipe for a liquid coolant extending into said high voltage electrode tube in a fluid-tight manner;

a grounded electrode disposed concentrically about the high voltage electrode tube so as to define an air gap therebetween within which air to be ozonized may be passed, and adapted to be cooled by a coolant which is recirculated through a path which is sealed off or separated from said air gap so as to prevent contamination of said air to be ozonized by said coolant;

the high voltage electrode tube being cooled by recycling a low electric conductivity liquid coolant through the inlet pipe, the inner part, and the outlet pipe of the high voltage electrode tube, and being sealed so as to likewise prevent contamination of said air to be ozonized by said coolant;

the liquid coolant for the high voltage electrode tube being deionized water and an ion-exchange resin being disposed in a recycling passage of the deionized water to maintain the electric conductivity of the deionized water below a predetermined value.

6. An ozone generating apparatus comprising:

a high voltage electrode tube having an inner part, an inlet pipe and an outlet pipe for a liquid coolant extending into said high voltage electrode tube in a fluid-tight manner;

a grounded electrode disposed concentrically about the high voltage electrode tube so as to define an air gap therebetween within which air to be ozonized may be passed, and adapted to be cooled by a coolant which is recirculated through a path which is sealed off or separated from said air gap so as to prevent contamination of said air to be ozonized by said coolant;

the high voltage electrode tube being cooled by recycling a low electric conductivity liquid coolant through the inlet pipe, the inner part, and the outlet pipe of the high voltage electrode tube, and being sealed so as to likewise prevent contamination of said air to be ozonized by said coolant;

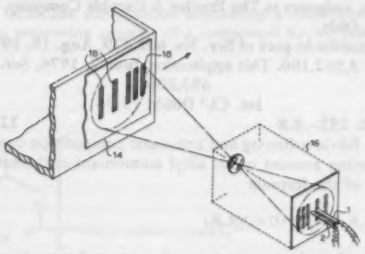
the liquid coolant for the high voltage electrode tube being a mixture of a deionized water and a glycol and an ion-exchange resin being disposed in a recycling passage of the deionized water to maintain the electric conductivity of the deionized water below a predetermined value to be able to cool below 0° C.

4,025,442

## CODED LABEL AND DECODING MEANS AND METHOD

Ralph Sherwill Cass, Mansfield, Canada, assignor to Ferranti-Packard Limited, Toronto, Canada

Filed Feb. 2, 1976, Ser. No. 654,067
Claims priority, application Canada, Feb. 19, 1975, 220610
Int. Cl.² G06K *7/10*
U.S. Cl. 250—568 9 Claims



1. Method of providing clocking pulses for use in the detection of information on a surface wherein a predetermined number of potential mark locations are disposed serially and spaced at equal intervals from each other, such serial disposition being arranged to extend in the intended direction of relative movement of said marks past a detecting means, wherein there are provided a first series of marks which may be differentiated by detecting means from the surrounding area on said surface at regularly spaced ones of said potential mark locations, and providing at selected ones of the remaining mark locations marks detectable by said detection means;

whereby the location of a mark of said first series and the potential mark locations spacing such mark from the next mark of said series form a cyclical series,

whereby the location of a mark of said first series and the potential mark locations spacing such mark from the next mark of said series form a cyclical series,

substantially simultaneously detecting the presence or absence of marks, at a number of detection locations, spaced serially along the relative path of the potential mark locations,

the number of detector locations corresponding to the number of potential mark locations in a cyclical series,

said detector locations being arranged so that simultaneous detections are made of potential mark locations each of which has a different position in such a cyclical series,

deriving from said substantially simultaneous detections a signal each time a mark is detected at any one of said detector locations, whereby such signals appear at a rate corresponding to that at which said potential mark locations pass a detection means,

the extent of said first series of marks being selected so that a mark of said first series is detected by at least one of said detectors at times when a mark may be detected by one of the other detectors.

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4,025,443

## CLAY-FREE WELLBORE FLUID

Jack M. Jackson, P.O. Box 35221, Houston, Tex. 77035

Filed Mar. 17, 1975, Ser. No. 558,817
Int. Cl.² C09K *7/02*
U.S. Cl. 252—8.5 A 15 Claims

1. A wellbore fluid additive viscosifying composition having improved viscosity stability in wellbore fluids for use in clay-free non-argillaceous aqueous brine fluids which contain at least 1.0% by weight of a soluble salt of potassium sodium or calcium consisting essentially of hydroxyalkyl guar gum selected from the group consisting of hydroxyl ethyl guar gum, hydroxy propyl guar gum and hydroxy butyl guar gum and at

least about 10 weight percent of magnesia or magnesium hydroxide based on hydroxy alkyl guar gum.

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**4,025,444**

## FABRIC SOFTENING AGENTS

**Alan P. Murphy, and Rickey Kretschmar, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Continuation-in-part of Ser. No. 605,479, Aug. 18, 1975, Pat. No. 3,962,100. This application June 7, 1976, Ser. No. 693,806**

**Int. Cl.² D06M** *13/36*

**U.S. Cl. 252—8.8** **22 Claims**

**1.** A fabric softening and anti-static composition comprising a softening amount of an alkyl ammonium carbamate compound of the formula

$$R_1R_2NH_2{}^+O^-(O)CNR_3R_4$$

wherein $R_1$ is hydrogen or an alkyl group having from 1 to 9 carbon atoms, $R_2$ is an alkyl group having from 6 to 9 carbon atoms, $R_3$ is hydrogen or an alkyl group having from 1 to 9 carbon atoms, and $R_4$ is hydrogen or an alkyl group having from 1 to 9 carbon atoms, provided the sum of the carbon atoms in $R_1$, $R_2$, $R_3$, and $R_4$ is at least 10; and sufficient suspending agent to suspend said alkyl ammonium carbamate in water.

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**4,025,445**

## BORON AMIDE LUBRICATING OIL ADDITIVE

**Walter W. Hellmuth, Hopewell Junction, and Edward F. Miller, Wappingers Falls, both of N.Y., assignors to Texaco Inc., New York, N.Y.**

**Filed Dec. 15, 1975, Ser. No. 640,530**

**Int. Cl.² C10M** *1/14;* **C07F** *5/02*

**U.S. Cl. 252—49.6** **10 Claims**

**1.** An oil-soluble nitrogen and boron-containing lubricant additive prepared by mixing a chlorinated aliphatic hydrocarbon having an average molecular weight ranging from about 750 to 2500 chlorinated to from about 0.75 to 10 weight percent chlorine with an alkylene polyamine, represented by the formula:

$$H_2N-(R-\overset{H}{\underset{|}{N}}-)_y-H$$

in which R is divalent ethylene, propylene or polymethylene radical, provided that when R is polymethylene, R represents from 2 to 6 methylene groups, and *y* is an integer from 1 to 10, in the proportion of from about 1 to 5 moles of said alkylene polyamine per gram atom of chlorine contained in said chlorinated hydrocarbon, and reacting said mixture at a temperature in the range from about 250° to 400° F in the presence of a hydrogen chloride acceptor to form a nitrogen-containing reaction product, and reacting said nitrogen-containing reaction product with a boron-containing compound selected from the group consisting of boron oxide, boron oxide hydrate, boron triflouride, boron tribromide, boron trichloride and boric acid, in the proportion of from about 0.20 to 1.5 moles of said boron-containing compound per mole of said nitrogen-containing reaction product at a temperature in the range from about 200 to 350° F to produce a nitrogen-and boron-containing additive characterized by containing from about 0.5 to 2.5 weight percent nitrogen and from about 0.050 to 2.0 weight percent boron.

**8.** A lubricating composition comprising a major proportion of a lubricating oil and a minor proportion of the composition of claim **1.**

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**4,025,446**

## LUBRICANT COMPOSITIONS CONTAINING NITRILE ANTIWEAR ADDITIVES

**Ronald J. Cier, East Windsor, and Robert F. Bridger, Hopewell, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.**

**Filed Dec. 10, 1975, Ser. No. 639,548**

**Int. Cl.² C10M** *1/32*

**U.S. Cl. 252—51.5 R** **12 Claims**

**1.** A lubricant composition comprising a major proportion of a lubricant consisting essentially of an oil of lubricating viscosity or grease prepared therefrom and a minor antiwear amount of a compound having the structure Y(CN)n is which *n* is a whole number from 3 to 6 and when *n* is 3, Y is a tris(ethyleneoxy) paraffin having from 3 to 12 carbon atoms, when *n* is 4, Y is a tetrakis(ethyleneoxy) paraffin having from 4 to 12 carbon atoms, when *n* is 5 Y is a pentakis(ethyleneoxy) paraffin having from 5 to 16 carbon atoms, and when *n* is 6, Y is a hexakis(ethyleneoxy) cycloparaffin having from 6 to 16 carbon atoms.

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**4,025,447**

## ESTERS AS COMPONENTS OF LUBRICANTS

**Giuseppe Mancini, Melegnano; Luigi Imparato, Milan, and Dario Schillani, Peschiera Borromeo, all of Italy, assignors to Snam Progetti S.p.A., Milan, Italy**

**Filed Apr. 29, 1975, Ser. No. 572,651**

**Claims priority, application Italy, May 8, 1974, 22398/74**

**Int. Cl.² C10M** *3/20*

**U.S. Cl. 252—56 S** **12 Claims**

**1.** An ester prepared by reacting

a. a mixture of tri-, tetra- and hexafunctional polyols in which the molar ratio of the trifunctional polyol to the other polyols is from about 0.5:1 to 10:1 and in which the molar ratio of the hexafunctional polyol to the tetrafunctional polyols is from about 0 to 1.2:1, and

b. a mixture of linear alkyl monocarboxylic acids comprised of (i) one or more acids having from 7 to 8 carbon atoms and (ii) one or more acids having from 12 to 18 carbon atoms, the molar ratio of acids (i) to acids (ii) being from about 1.5:1 to 6:1.

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**4,025,448**

## SUPERPARAMAGNETIC WAX COMPOSITIONS USEFUL IN MAGNETIC LEVITATION SEPARATIONS

**Jean Josephine Sudol, New York, N.Y., assignor to Union Carbide Corporation, New York, N.Y.**

**Filed Dec. 29, 1975, Ser. No. 645,039**

**Int. Cl.² H01F** *1/00, 1/28*

**U.S. Cl. 252—60** **9 Claims**

**1.** Superparamagnetic composition which comprises a mixture of from 10 to 90 weight percent of a hydrocarbon wax and from 90 to 10 weight percent of an oxygenated wax based on the total wax content of the overall composition, said total wax constituting at least 10 **containing a colloidal dispersion therein of from** 1 to 70 weight percent, based on the weight of the overall composition of a superparamagnetic substance, and from 1 to 20 weight percent based on the weight of the overall composition of at least one surface active agent selected from the group consisting of anionic, cationic, and non-ionic dispersants, said dispersant being at least partially solvatable in the said wax mixture.

4,025,449

## PROCESS TO PRODUCE BARIUM AND STRONTIUM FERRITE

Paul A. Pezzoli, and Stanley F. Spangenberg, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 21, 1975, Ser. No. 624,363
Int. Cl.² C04B 35/26
U.S. Cl. 252—62.63 17 Claims

1. A method of forming magnetic barium and strontium ferrites comprising (a) admixing an alkaline earth metal compound selected from compounds of barium and strontium with a sufficient amount of an aqueous solution containing from about 10 to about 60 weight percent alkali metal hydroxide to form a solution; (b) heating the solution of step (a) to within the range of from about 90° to about 130° C; (c) admixing a sufficient amount of soluble iron compound with the heated solution to form a magnetic spinel precipitate which is at least partially amorphous; and (d) removing the precipitate from the mixture of step (c).

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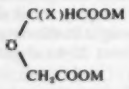
4,025,450

## DETERGENT COMPOSITION

Vincent Lamberti, Upper Saddle River, and Mark D. Konort, Haworth, both of N.J., assignors to Lever Brothers Company, New York, N.Y.

Continuation-in-part of Ser. No. 187,115, Oct. 6, 1971, abandoned. This application Feb. 14, 1972, Ser. No. 226,213
Int. Cl.² C11D 1/00
U.S. Cl. 252—89 R 8 Claims

1. A detergent composition consisting essentialy of a water-soluble organic detergent compound selected from the group consisting of anionic, nonionic, zuritterionic and ampholytic detergent compounds and as a detergent builder a compound represented by the formula:




wherein X is an alkyl having from 1 to 4 carbon atoms and M is selected from the group consisting of alkali metals, ammonium, methylammonium, tetramethylammonium, normal monoethanolamine, diethanolamine, triethanolamine salts, normal monoisopropanolamine salts, normal diisopropanolamine salts and normal morpholine salts, the weight ratio of detergent builder to detergent compound ranging from about 1:20 to about 50:1.

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4,025,451

## SULFURIZED MANNICH BASES AS LUBRICATING OIL DISPERSANT

Larry Plonsker, Baton Rouge, La., and Robert E. Malec, Birmingham, Mich., assignors to Ethyl Corporation, Richmond, Va.

Division of Ser. No. 397,414, Sept. 14, 1973, Pat. No. 3,904,595. This application June 6, 1975, Ser. No. 584,519
Int. Cl.² C10M 1/38
U.S. Cl. 252—47.5 11 Claims

1. Mineral lubricating oil containing a dispersant amount of a product made by the process comprising heating to a temperature of about 50°–300° C a mixture of (1) from about 1–20 parts by weight of elemental sulfur and (2)about 100 parts by weight of a condensation product made by reacting about (a) one molar part of a high molecular weight alkylphenol wherein said alkyl has a molecular weight of from about 600–3000, (b) about 0.1–10 mole parts of an amine containing from 1 to about 20 carbon atoms and having at least one > NH group capable of entering into a Mannich condensation reaction, and (c) about 0.1–10 mole parts of an aliphatic aldehyde containing from 1 to about 6 carbon atoms.

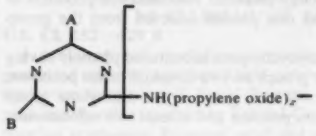
4,025,452

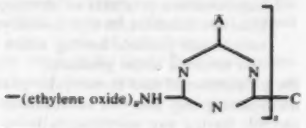
## ETHER-LINKED POLYMERS AND COMPOSITIONS CONTAINING THEM

John C. Nnadi, Glassboro, and Israel Joel Heilweil, Princeton, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

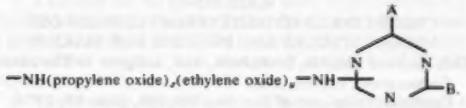
Filed May 12, 1975, Ser. No. 576,935
Int. Cl.² C10M 1/32, 3/26, 5/20, 7/30
U.S. Cl. 252—51.5 A 10 Claims

1. A lubricant composition containing a dispersancy and viscosity improving amount of a compound having the structure:




in which:
A and B may be the same or different substitutents and are individually selected from the group consisting of: hydrogen, alkyl having a chain length from 1 to 100 carbon atoms, alkenyl having a chain length from 1 to 100 carbon atoms, hydroxy, amino, anilino, imidazolines, mannich bases, pyrrolidines, pyrrolidones, succinimide amino, and lactam amino; *x*, *y*, and *z* are zero or a whole number and at least one of *x* and *y* is a whole number, and
C is

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4,025,453

## ACTIVATED BLEACHING PROCESS AND COMPOSITIONS THEREFOR

Louis Kravetz, and Eugene F. Lutz, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Feb. 9, 1976, Ser. No. 656,464
Int. Cl.² C11D 7/54
U.S. Cl. 252—102 27 Claims

1. A process for activating a peroxide-based bleach which comprises conjointly incorporating into an aqueous medium effective amounts of (a) a peroxide-based bleach, (b) a peroxide-activating amount of cyanamide and (c) a buffering agent to maintain the pH of the aqueous medium above 7.5.

8. A stable concentrated liquid bleaching composition consisting essentially of an aqueous solution of from 2.5 to about 35% by weight, calculated as hydrogen peroxide, of a peroxide-based bleach, a peroxide-activating amount of cyanamide and a buffering agent to maintain the pH of the aqueous solution from about 2 to 5.

## 4,025,454
## ADHERENCE OF TEXTILE FIBERS TO UNSATURATED POLYMERS

**Georges Rouzier, Clermont-Ferrand, France, assignor to Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie, France**

**Continuation of Ser. No. 397,608, Sept. 14, 1973, abandoned, which is a division of Ser. No. 241,815, April 6, 1972, Pat. No. 3,817,890, which is a continuation-in-part of Ser. No. 802,268, Feb. 25, 1969, abandoned. This application May 9, 1975, Ser. No. 576,130**

**Claims priority, application France, Feb. 26, 1968, 68.141324**

**Int. Cl.² C08K** *5/13*

**U.S. Cl. 252—182** **1 Claim**

1. A blend of resorcinol-phenolic condensation products of resorcinol and at least one phenol selected from the group consisting of

1. monocyclic or polycyclic para-substituted phenols having active methylene groups on two terminal ortho positions,
2. monocyclic phenols having one active methylene group on an ortho or para position and at least two substituents, and
3. condensation products of monocyclic phenols having at least two substituents with monocyclic or polycyclic para-substituted phenols having active methylene groups on two terminal ortho positions,

the proportion of said monocyclic phenols having one active methylene group and two substituents or of said monocyclic phenols having two substituents being less than 50% of the total amount of phenols; the major part of said resorcinol-phenolic condensation products having at least one terminal resorcinol nucleus attached to a phenol nucleus through one of said active methylene groups, the other terminal nucleus of said condensation products being a resorcinol nucleus or a phenol nucleus with at least two substituents, and being soluble or dispersible in isopropyl alcohol; said blend of resorcinol-phenolic condensation products having been prepared by condensing in the presence of an acid catalyst at a temperature from about 70° to about 200° C. for from about 1 hour to about 24 hours a stoichiometric excess of resorcinol with said phenol while removing the water of condensation.

## 4,025,455
## CROSS-LINKED HYDROXYPROPYLCELLULOSE MICROCAPSULES AND PROCESS FOR MAKING

**Dale Richard Shackle, Scottsboro, Ala., assignor to The Mead Corporation, Dayton, Ohio**

**Continuation-in-part of Ser. No. 480,956, June 19, 1974, abandoned. This application Apr. 2, 1976, Ser. No. 673,003**

**Int. Cl.² B01J** *13/02*

**U.S. Cl. 252—316** **12 Claims**

1. A process for forming microcapsules comprising the steps of:

a. preparing an aqueous solution containing a hydroxypropylcellulose wall forming compound, said hydroxypropylcellulose wall forming compound containing reactive hydroxyl groups and being characterized by having decreasing solubility with increasing temperature in aqueous solution;

b. preparing an oil solution containing an oil soluble cross-linking agent for said hydroxypropylcellulose wall forming compound in an oil to be encapsulated, said oil soluble cross-linking agent being a polyfunctional isocyanate, containing more than one group capable of reacting with hydroxyl groups to provide cross-linkage with said hydroxypropylcellulose wall forming compound;

c. mixing said aqueous solution with said oil solution in a manner such that an emulsion is formed having droplets of said oil solution dispersed in said aqueous solution;

d. heating said mixture to a temperature of from about 45° C to about 52° C to cause the formation of a precipitate of said hydroxypropylcellulose wall forming compound on said droplets of said oil solution, said precipitate resulting from the interaction of said precipitate resulting from the interaction of said hydroxypropylcellulose wall forming compound and said oil soluble, polyfunctional isocyanate cross-linking agent to form microcapsule walls; and

e. maintaining the temperature of said heated mixture at temperature and for a time sufficient to permit said microcapsule walls to become substantially oil and water impermeable.

9. A microcapsule comprising:

a. a nuclear solution, said nuclear solution including an oil solvent, and

b. a microcapsules wall encapsulating said nuclear solution, said microcapsules wall comprising hydroxypropylcellulose cross-linked with oil soluble polyfunctional isocyanate, said microcapsule wall being substantially oil and water impermeable

## 4,025,456
## POLYSILOXANE-POLYOXYALKYLENE BLOCK COPOLYMERS

**Carl James Litteral, Marietta, Ohio, and David Lee Mullins, Williamstown, W. Va., assignors to Union Carbide Corporation, New York, N.Y.**

**Division of Ser. No. 507,998, Sept. 20, 1974, Pat. No. 3,980,688. This application July 1, 1976, Ser. No. 701,670**

**Int. Cl.² B01F** *17/42*

**U.S. Cl. 252—351** **15 Claims**

1. A polyoxyalkylene polyether admixture consisting essentially of from about 20 to about 80 percent by weight of component (A) and from about 80 to about 20 percent by weight of component (B), said percentages being based on the total weight of components (A) and (B) present in the admixture, wherein component (A) represents low molecular weight polyoxyalkylene polyether, said polyether being selected from the class consisting of (i) a polyoxyalkylene copolymer having an average molecular weight in the range of from about 800 to about 2300 wherein about 20 to about 60 weight percent of the oxyalkylene groups of said copolymer are oxyethylene, the remainder of the oxyalkylene groups being oxypropylene, and (ii) a blend of at least two polyoxyalkylene copolymers having different average molecular weights in the range of from about 500 to about 2900 and wherein about 20 to about 60 weight percent of the oxyalkylene groups of the copolymers in said blend are oxyethylene, the remainder of the oxyalkylene groups being oxypropylene, with the proviso that said blend has an average molecular weight in the range of from about 800 to about 2300; and wherein component (B) represents high molecular weight polyoxyalkylene polyether, said polyether being selected from the class consisting of (i) a polyoxyalkylene copolymer having an average molecular weight in the range of from about 3400 to about 5500, wherein about 20 to about 60 weight percent of the oxyalkylene groups of said copolymer are oxyethylene, the remainder of the oxyalkylene groups being oxypropylene, and (ii) a blend of at least two polyoxyalkylene copolymers having different average molecular weights in the range of from about 3000 to about 5500 and wherein about 20 to about 60 weight percent of the oxyalkylene groups of the copolymers in said blend are oxyethylene, the remainder of the oxyalkylene groups being oxypropylene, with the proviso that said blend has an average molecular weight in the range from about 3400 to 5500, and wherein the polyoxyalkylene copolymers of (A) and (B) contain terminal groups selected from the class consisting of hydroxy and alkoxy [illegible] copolymer and terminal groups selected from the class consisting of alkoxy, aryloxy and aralkyloxy at the other end of the copolymer, with the proviso that when the copolymer contains a terminal alkanyloxy group at one end, the terminal group at the other end of the copolymer can also be acyloxy; with the added proviso that said admixture of (A) and (B) has an average molecular weight in the range of about 1600 to about 2900.

4,025,457

## PROCESS FOR MANUFACTURING GASEOUS MIXTURES RICH IN HYDROGEN

Tadayoshi Tomita, Yokohama; Katsutoshi Kikuchi, Fujisawa, and Takayuki Sakamoto, Tokyo, all of Japan, assignors to Toyo Engineering Corporation, Tokyo, Japan

Division of Ser. No. 521,865, Nov. 7, 1974, Pat. No. 3,957,681, which is a continuation of Ser. No. 178,264, Sept. 7, 1971, abandoned. This application Feb. 13, 1976, Ser. No. 657,965
Claims priority, application Japan, Sept. 4, 1970, 45-77613
Int. Cl.² C01B *2/10, 2/14*
U.S. Cl. 252—373 4 Claims

1. A process for manufacturing gaseous mixtures rich in hydrogen by the catalytic steam reforming of a feed stock of normally liquid hydrocarbons which comprises feeding into a reactor said feed stock and steam at a molar ratio of steam/-carbon in the range of from about 2/1 to 10/1 and therein contacting same with particles of reforming catalyst, at a temperature in the range of from above 850° to 1100° C, at a pressure of from 1 to 300 atmospheres, at a space flow velocity of from 1000 to 3000/hr. said reforming catalyst consisting essentially of a silica-free crystalline eutectic of aluminum oxide, 20 to 60 weight percent of strontium oxide and 10 to 60 weight percent of calcium oxide, and wherin the steam/carbon molar ratio and the reaction temperature are effective to prevent deposition of carbon on said reforming catalyst.

3. A process for manufacturing gaseous mixtures rich in hydrogen by the catalytic steam reforming of a feed stock of normally liquid hydrocarbons which comprises feeding into a reactor said feed stock and steam at a molar ratio of steam/-carbon in the range of from about 2/1 to 10/1 and therein contacting same with particles of reforming catalyst, at a temperature in the range of from above 850° to 1100° C, at a pressure of from 1 to 300 atmospheres, at a space flow velocity of from 1000 to 3000/hr. said reforming catalyst consisting essentially of a silica-free crystalline eutectic of from 20 to 60 weight percent of strontium oxide and the balance of aluminum oxide, and wherein the steam/carbon molar ratio and the reaction temperature are effective to prevent deposition of carbon on said reforming catalyst.

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4,025,458

## PASSIVATING METALS ON CRACKING CATALYSTS

Dwight L. McKay, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation of Ser. No. 550,584, Feb. 18, 1975, abandoned. This application Aug. 12, 1976, Ser. No. 713,776
Int. Cl.² B01J *21/20;* C10G *11/04;* C07F *9/90*
U.S. Cl. 252—416 5 Claims

1. A process for passivating metal on an active clay cracking catalyst which has become contaminated with at least one metal of the group consisting of nickel, vanadium, and iron which comprises contacting said catalyst with at least one antimony compound having the formula

wherein the R groups which can be the same or different are hydrocarbyl radicals having from 1 to about 18 carbon atoms per radical, the total number of carbon atoms in the molecule bring 6 to about 90, for a time sufficient to passivate said metal on said catalyst.

2. A process in accordance with claim 1 wherein the radicals R are selected from the group consisting of alkyl radicals having 2 to about 10 carbon atoms per radical, substituted or unsubstituted cyclopentyl or cyclohexyl radicls or substituted or unsubstituted phenyl radicals.

5. A process in accordance with claim 1 wherein an active clay cracking catalyst is contacted with that antimony compound and heat treated therewith in the presence of free oxygen in order to regenerate said catalyst.

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4,025,459

## NOBLE METAL HYDROGENATION CATALYSTS PROMOTED BY FLUORIDE CONTAINING ACIDS

Jos Wristers, Plainfield, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed May 14, 1975, Ser. No. 577,351
Int. Cl.² B01J *31/28, 27/12*
U.S. Cl. 252—429 R 21 Claims

1. A hydrogenation catalyst comprising a liquid acid system promoted material, said liquid acid system being selected from the group consisting of liquid fluorine containing Bronsted acid and fluorine containing Friedel-Crafts catalyst in liquid fluorine containing Bronsted acid and said liquid acid promoted material being selected from the group consisting of the elemental, oxide and sulfide forms of platinum and iridium and the elemental and oxide forms of palladium.

2. The catalyst of claim wherein the liquid fluorine-containing Bronsted acid is selected from the group consisting of liquid HF, fluorosulfonic acid and trifluoromethane sulfonic acid.

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4,025,460

## CATALYST FOR GASIFICATION OF HEAVY HYDROCARBONS IN FLUIDIZED BED

Mikio Ueda, Takatsuki; Takeshi Kubota, Yachiyo; Yasuo Nishikawa, Okayama, and Akira Watanabe, Shinogoze, all of Japan, assignors to Kyushu Taika Renga Kabushiki Kaisha and Mitsui Shipbuilding and Engineering Co., Ltd., Japan

Filed June 4, 1975, Ser. No. 583,580
Int. Cl.² B01J *29/00, 23/58*
U.S. Cl. 252—457 4 Claims

1. A catalyst for the gasification of heavy hydrocarbons in a fluidized bed which contains CaO and is characterized in that a part or the whole of said CaO exists in the form of at least one member selected from the group consisting of $2CaO \cdot Fe_2O_3$, $2CaO \cdot SiO_2$ and $3CaO \cdot SiO_2$.

4. A catalyst for the gasification of heavy hydrocarbons in a fluidized bed as claimed in claim 1, to which less than 70% by weight of MgO is added.

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4,025,461

## OXYCHLORINATION OF HYDROCARBONS IN THE PRESENCE OF NON-HALIDE COPPER CONTAINING CATALYSTS

Louis J. Croce, Seabrook, Tex.; Laimonis Bajars, Princeton, and Maigonis Gabliks, Highland Park, both of N.J., assignors to Petro-Tex Chemical Corporation, Houston, Tex.

Division of Ser. No. 889,671, Dec. 31, 1969, abandoned. This application May 12, 1975, Ser. No. 576,590
Int. Cl.² B01J *23/10, 27/02, 27/14, 27/24*
U.S. Cl. 252—462 9 Claims

1. An oxychlorination catalyst composition calcined at 600° to 1100° C and consisting of a non-halide copper component of copper and an element selected from the group consisting of O, S, N, P, As, Pb, Fe, Cr, Mo, W, V, Ti and mixtures thereof and a rare earth compound, said rare earth being selected from the group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu and mixtures thereof and the atomic ratio of rare earth to copper being in the range of 4 to 0.1:1.

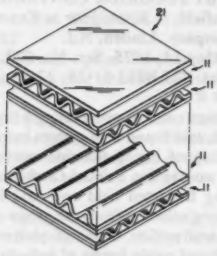
## 4,025,462
## CERAMIC CELLULAR STRUCTURE HAVING HIGH CELL DENSITY AND CATALYST LAYER

**Joseph J. Cleveland, Wysox, Pa., assignor to GTE Sylvania Incorporated, Stamford, Conn.**

**Division of Ser. No. 455,193, March 27, 1974, Pat. No. 3,943,994, which is a continuation-in-part of Ser. No. 313,101, Dec. 7, 1972, abandoned. This application Oct. 31, 1975, Ser. No. 627,536**

**Int. Cl.² F28D** *17/00;* **B32B** *3/28*

**U.S. Cl. 252—477 R** **1 Claim**



**1.** A cellular structure of green ceramic tape consisting essentially of finely divided sinterable solid particles of ceramic raw materials substantially uniformly distributed throughout a fugitive plastic supporting matrix, the cells of the structure being defined by alternate corrugated and flat ceramic tape members wherein said cells completely traverse the article from one face to the opposite face thereof, the weight ratio of said supporting matrix to said raw materials in said tape being from about 1:3 to about 1:6, said supporting matrix consisting essentially of from about 28.5 to about 74.5 weight percent of a two-part resin, the resin consisting essentially of polyvinyl butyral in the amount of from 50 to 95 weight percent, remainder an amine thermosetting resin selected from the group consisting of melamine formaldehyde and urea formaldehyde, and from about 25 to about 70 weight percent of a plasticizer selected from the group consisting of alkyl phthalate and dialkyl phthalate plasticizers and from about 0.5 to about 1.5 weight percent of a deflocculating agent, the structure bearing a surface layer containing a catalyst, the structure, after firing, defining a catalytic converter.

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## 4,025,463
## ORGANIC SEMICONDUCTOR COMPOSITIONS

**Donald J. Trevoy, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Division of Ser. No. 482,960, June 25, 1974, Pat. No. 3,963,498, which is a continuation-in-part of Ser. No. 212,640, Dec. 27, 1971, abandoned, and Ser. No. 455,705, March 28, 1974, abandoned. This application Feb. 2, 1976, Ser. No. 654,437**

**Int. Cl.² H01L** *13/00;* **H01B** *1/00*

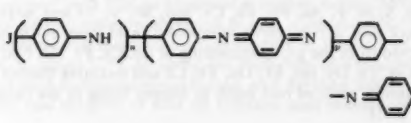
**U.S. Cl. 252—500** **5 Claims**

**1.** A semiconductor composition comprising, in liquid solution, a binder and a semiconductor having organic solvent solubility and represented by the expression:

$$D[A]_q$$

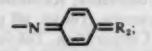
wherein:

D represents a moiety having the structure:

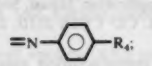


in which

J represents either $R_1$ or a group having the formula



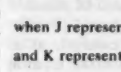
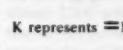
K represents either $R_3$ or a group having the formula



$R_1$ and $R_4$ are each selected from the group consisting of a hydrogen atom, a hydroxy radical, a lower alkyl radical, a lower alkoxy radical, an amino radical, an aryl radical, an acyl radical, a carboxylate radical, a thio radical, a nitrate radical, a sulfonate radical, a halogen atom and a cyano radical;

$R_2$ and $R_3$ each represent (1) an uncharged radical selected from the group consisting of oxo, imino and thioxo radicals or (2) a charged radical selected from the group consisting of alkoxonium, iminium, and sulfonium radicals; and

*n* and *p* are each integers having the following combinations of values:

| | |
|---|---|
| when J represents  and K represents $R_3$, | p = 0 n = 0, 1, 2, 3, 4, 5<br>p = 1 n = 0, 1, 2, 3<br>p = 2 n = 0, 1 |
| when J represents $R_1$ and K represents $R_3$, | p = 0 n = 0, 1, 2, 3, 4, 5, 6<br>p = 1 n = 0, 1, 2, 3, 4<br>p = 2 n = 0, 1, 2<br>p = 3 n = 0 |
| when J represents $R_1$ and K represents  | p = 0 n = 0, 1, 2, 3, 4, 5<br>p = 1 n = 0, 1, 2, 3<br>p = 2 n = 0, 1; |

A is an acid when $R_2$ and $R_3$ are each an uncharged radical and when $R_2$ and/or $R_3$ is a charged radical, A is an anion derived from an acid; and

*q* represents the number of A moieties associated with each D and is a positive integer that is greater than 0 and less than or equal to the number of amine groups in the D moiety.

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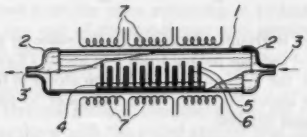
## 4,025,464
## COMPOSITION FOR DIFFUSING PHOSPHORUS

**Mitsuo Yamashita, 13-28-1 1, Sakurashi, Setagaya, Tokyo; Akio Mikogami, 18-25-5, Morino, Machida, Tokyo; Masashi Hasegawa, 60-301, Kamitsuruma, Sagamihara, Kanagawa, and Hiroshi Oizumi, 16-15-4, Aioi, Sagamihara, Kanagawa, all of Japan**

**Division of Ser. No. 411,766, Nov. 1, 1973, Pat. No. 3,931,039. This application May 13, 1975, Ser. No. 576,957**

**Int. Cl.² H01B** *1/00, 1/06*

**U.S. Cl. 252—500** **2 Claims**



**1.** A method for the preparation of a composition for diffus-

ing phosphorus which comprises mixing 95 – 30 parts by weight of phosphorus nitride powder with 5 – 70 parts by weight of silicon dioxide powder and hot pressing the mixed powder at 700° – 950° under a pressure of 50 – 500kg/cm² for 5 – 60 minutes in an inert gas atmosphere.

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## 4,025,465
## FOAMABLE VINYL CHLORIDE POLYMER COMPOSITIONS

**Clive Dorrn, Langford, and Rex William Gould, Welwyn Garden City, both of England, assignors to Imperial Chemical Industries Limited, London, England**

**Filed Dec. 4, 1972, Ser. No. 311,521**

**Claims priority, application United Kingdom, Dec. 9, 1971, 57260/71**

**Int. Cl.² C08J 9/02, 9/06**

**U.S. Cl. 260—2.5 R** **6 Claims**

1. A foamable rigid vinyl chloride polymer composition having a B.S. softness of 0–10 in the unexpanded state containing as foam stabilizer at least one alkyl acrylate polymer made by polymerizing monomers consisting essentially of an alkyl acrylate and 0–25% by weight thereof of at least one comonomer selected from the group consisting of styrene, alkyl methacrylates, acrylamides and other alkyl acrylates in an amount of 0.2 to 2.5% by weight of the vinyl chloride polymer in said composition.

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## 4,025,466
## PROCESS FOR PREPARING POLYURETHANE FOAM AND FOAM SO OBTAINED

**Lucien Jourquin, Wetteren, and Eddie Du Prez, Zottegem, both of Belgium, assignors to S.A. PRB, Brussels, Belgium**

**Filed Oct. 3, 1974, Ser. No. 511,826**

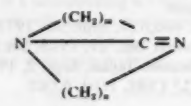
**Claims priority, application Luxembourg, Oct. 3, 1973, 68552**

**Int. Cl.² C08G 18/20, 18/22, 18/75, 18/73**

**U.S. Cl. 260—2.5 AC** **13 Claims**

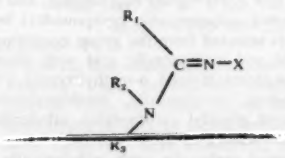
1. A process for preparing a polyurethane foam comprising reacting in one stage an aliphatic or alicyclic polyisocyanate with a polyol in the presence of water and a catalyst combination comprising:

a. a compound having the general formula $>N-C=N$ selected from the group consisting of diazabicycloalkene according to formula:



(I)

wherein *m* is an integer of 3 to 7 and *n* is an integer of 2 to 4, the salts thereof formed with acetic acid, phenol or fumaric acid and the guanidine derivatives having the general formula:



(II)

wherein $R_1$ is a $C_1$ to $C_{20}$ alkyl radical or a group

in which $R_4$ and $R_5$ are identical or different and represent hydrogen or a $C_1$ to $C_3$ alkyl radical, $R_2$ and $R_3$ are identical or different and represent hydrogen or $C_1$–$C_3$ alkyl radical; and X represents hydrogen, a $C_1$ to $C_{20}$ alkyl radical, a cycloalkyl radical, or phenyl radical, said $C_1$–$C_{20}$ alkyl, cycloalkyl or phenyl radical being unsubstituted or substituted by one or more halogen atoms, by one or more linear or branched $C_1$ to $C_8$ alkyl groups, $C_2$ to $C_8$ alkenyl groups, or $C_2$ to $C_8$ alkynyl groups, by a phenyl group or by a carboxyl group, and the salts of said guanidine derivatives formed with carbonic acid, phenol or benzoic acid, and

b. a compound selected from the group consisting of alkaline or alkaline earth metal salts of carboxylic acids having the structural formula $R-(CO_2H)_x$ wherein *x* is 1 or 2 and the metal alcoholates and phenolates having the structure M′ OR′, wherein R represents:

hydrogen, a linear or branched $C_1$ to $C_{20}$ alkyl, $C_2$ to $C_{20}$ alkenyl or $C_2$ to $C_{20}$ alkynyl radical, these radicals being unsubstituted or substituted by one or more halogens,

A $C_3$ to $C_6$ cycloalkyl radical which is unsubstituted or substituted by one or more $C_1$ to $C_8$ alkyl, $C_2$ to $C_8$ alkenyl or $C_2$ to $C_8$ alkynyl groups, which are linear or branched,

a phenyl radical, unsubstituted or substituted by one or more halogens, or by one or more $C_1$ to $C_8$ alkyl, $C_2$ to $C_8$ alkenyl or $C_2$ to $C_8$ alkynyl groups, which are linear or branched, or by a phenyl group;

R′ represents a $C_1$ to $C_{20}$ alkyl, $C_2$ $C_{20}$ alkenyl or $C_2$ to $C_{20}$ alkynyl radical, linear or branched, which is unsubstituted or substituted by a phenyl group or by one or more halogens,

a $C_3$ to $C_6$ cycloalkyl radical which is unsubstituted or substituted by one or more linear or branched $C_1$ to $C_8$ alkyl, $C_2$ to $C_8$ alkenyl, $C_2$ to $C_8$ alkynyl groups, or

a phenyl radical, which is unsubstituted or substituted by one or more linear or branched $C_1$ to $C_{20}$ alkyl, $C_2$ to $C_{20}$ alkenyl, or $C_2$ to $C_{20}$ alkynyl groups, or by one or more phenyl groups or by one or more halogen of hydroxyl radicals, and

M′ is an alkaline metal.

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## 4,025,467
## STRONG ANION EXCHANGE RESINS FREE OF ACTIVE CHLORIDE AND METHOD OF PREPARATION

**Herbert B. Brock, Philadelphia, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.**

**Filed June 13, 1975, Ser. No. 586,676**

**Int. Cl.² C08J 5/20**

**U.S. Cl. 260—2.1 E** **15 Claims**

1. A process for preparing a strong anion exchange resin containing less than 0.5% of active chloride which comprises subjecting a strong anion exchange resin containing residual non-ionic chlorine in its polymeric network to solvolytic displacement which consists of contacting the resin with an aqueous solution having a pH of at least 7 and a temperature of at least 50° C for a period of time necessary to convert the non-ionic chlorine to chloride and thereafter removing the chlorine from the resin.

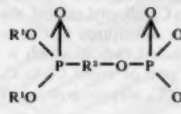
13. A strong anion exchange resin derived from vinly benzyl chloride when prepared in accordance with claim 1 wherein the available chloride is less than 0.1% by weight, based on the total ion capacity of the resin, which resin does not increase in available chloride content by more than 0.1% by weight, based on the total ion capacity of the resin, after standing under an inert atmosphere at a temperature between about 20° C and 30° C for 21 days.

## 4,025,468
## HALOGENATED PHOSPHORIC ESTERS AND FLAME-PROOFING COMPOSITIONS FOR POLYMERIC MATERIALS BASED THEREON

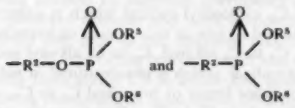
Mario Modena, and Roberto Bisel, both of Bollate, Italy, assignors to Montedison Fibre S.p.A., Milan, Italy

Filed Apr. 11, 1975, Ser. No. 567,155
Claims priority, application Italy, Apr. 12, 1974, 21366/74
Int. Cl.² C07F 9/09, 9/38; C08G 18/06
U.S. Cl. 260—2.5 AJ 7 Claims

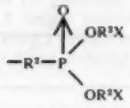
1. A mixture of halogenated phosphoric esters consisting essentially of at least two compounds having the general formula (I):



wherein $R^1$ is a $C_1$–$C_3$ alkyl group or an $R^2X$ group as defined hereinbelow, $R^2$ is a $C_2$–$C_3$ alkylene group, and $R^3$ and $R^4$ are independently selected from the group consisting of an —$R^2X$ group, wherein X is a halogen;



wherein $R^5$ and $R^6$ are independently selected from the group consisting of $R^1$, —$R^2X$ and



said compounds containing 2 to 6 phosphorus atoms and 0 to 3 halogen atoms per molecule.

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## 4,025,469
## NOVEL CATALYST SYSTEM FOR TRIMERIZATION ORGANIC ISOCYANATES

William J. Kauffman, Manheim, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

Filed Mar. 26, 1976, Ser. No. 670,881
Int. Cl.² C08G 18/14
U.S. Cl. 260—2.5 AW 15 Claims

1. In a method for the trimerization of organic isocyanates by the reaction of the isocyanate group, the improvement which comprises the step of carrying out said trimerization in the presence of a catalytically sufficient amount of a catalyst system comprising (1) N,N',N''-trisdialkylaminoalkyl-s-hexahydrotriazine and (2) a compound selected from the group consisting of 3,5-bis(N,N-dialkylaminoalkyl)-1,3,5-tetrahydrooxadiazine, 5-(N,N-dialkylaminoalkyl)-1,3,5-dihydrodioxazine and mixtures thereof.

## 4,025,470
## PROCESS FOR THE PRODUCTION OF FLAME-RESISTANT, HARD POLYURETHANE FOAMS

Karlheinz Andres, Cologne; Kuno Wagner, Leverkusen; Erwin Hoffmann, Leverkusen, and Manfred Kapps, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Apr. 24, 1975, Ser. No. 571,331
Claims priority, application Germany, May 7, 1974, 2421986
Int. Cl.² C08G 18/06, 18/14, 18/28
U.S. Cl. 260—2.5 AJ 8 Claims

1. In a process for the production of flame resistant, hard polyurethane foam from polyisocyanates, active-hydrogen containing compounds, water and/or blowing agents, and flame retarding agents, the improvement wherein the flame retarding agent used is a mixture of:

a. an addition compound of
   1. a monoalcohol, a polyalcohol or mixtures thereof, and
   2. a lactam; and
b. a phosphorous containing acid or acid ester, wherein component (a) is present in said mixture in an amount of from about 1 to about 99 percent by weight, and component (b) is present in said mixture in an amount of from about 99 to about 1 percent by weight, and wherein said addition compound is formed from 0.1 to 15 mols of component (1) and 1 mol of component (2).

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## 4,025,471
## NOVEL RESIN AND COATING COMPOSITION CONTAINING SAME

Mitsuru Takahashi, Hirakata, Japan, assignor to Nippon Paint Co., Ltd., Osaka, Japan

Division of Ser. No. 400,819, Sept. 26, 1973, Pat. No. 3,932,562. This application Oct. 29, 1975, Ser. No. 626,919
Claims priority, application Japan, Sept. 2, 1972, 47-98782
Int. Cl.² C08L 1/10, 67/06
U.S. Cl. 260—16 4 Claims

1. A coating composition containing a resin produced by graft polymerizing one or more ethylenically unsaturated polymerizable compounds onto a mercapto group-containing alkyd resin in a weight ratio of 5:95 to 70:30 said mercapto group-containing alkyd resin having mercapto groups in an amount of $1 \times 10^{-5}$ to $1 \times 10^{-2}$ gram equivalent/g, and said ethylenically unsaturated polymerizable compound(s) being one or more members selected from the group consisting of esters of acrylic acid and methyacrylic acid with alkanols having 1 to 15 carbon atoms, styrene, α-methylstyrene, vinyltoluene, p-t-butylstyrene, acrylonitrile, methacrylonitrile, etylenically unsaturated glycidyl carboxylates, ethylenically unsaturated monomers having at least one hydroxyl group, ethylenically unsaturated carboxylic acids, ethylenically unsaturated compounds having at least one blocked isocyanate group, acrylamide, methacrylamide, N-methylolacrylamide, N-alkoxymethylacrylamide having an alkyl moiety of 1 to 14 carbon atoms, diacetone acrylamide, hydroxymethyldiacetone acrylamide, N-methlolmethacrylamide, and N-alkoymethylmethacrylamide having an alkyl moiety of 1 to 14 atoms said resin having a glass transition temperature of 5° to 100° C and a weight average molecular weight of 5,000 to 100,000.

4,025,472

## PROCESS FOR DRYING POLYMER-MODIFIED CELLULOSE FIBRES AND PRODUCTS PRODUCED THEREBY

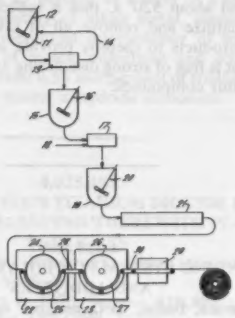
Pierre Lepoutre, Pointe Claire, Canada, assignor to Pulp and Paper Research Institute of Canada, Canada

Filed June 24, 1975, Ser. No. 589,941

Claims priority, application Canada, June 26, 1974, 203445/74

Int. Cl.² C08L 1/02, 1/26

U.S. Cl. 260—17.4 GC 21 Claims



1. In a process for drying modified cellulosic material having water retention properties, said cellulosic material being a graft polymerized cellulose, the grafting monomer being an alpha ethylenically unsaturated compound containing at least one functional moiety selected from the group consisting of acrylamide, acyl halide, nitrile, ester, alkenyl halide, carboxylate salt, and carboxylic acid and having been reacted with an aqueous alkali solution to hydrolyze or neutralize said functional moiety;

wherein the improvement comprises:

a. washing resultant alkali treated cellulosic material with water to lower the pH of said material so as to swell the material to at least 50% of the maximum swollen state thereof;

b. acidifying resultant swollen material to render the product to substantially the minimum swollen state thereof;

c. neutralizing the resultant acidified material with alkali dissolved in a non-swelling solvent to obtain the alkali salt form of said cellulosic material; and

d. thermally drying resultant alkali salt form of the graft-polymerized cellulosic material.

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4,025,473

## PROCESS FOR PRODUCING WATER-DILUTABLE COATING COMPOSITIONS

Mahmoud Rashad Rifi, Kendall Park, N.J., assignor to Union Carbide Corporation, New York, N.Y.

Filed Mar. 26, 1975, Ser. No. 562,138

Int. Cl.² C09D 3/54, 5/02

U.S. Cl. 260—19 R 10 Claims

1. A process that comprises the steps of:

a. reacting, under substantially anhydrous conditions, a phenolic resin with either (i) an adduct of a drying or semi-drying oil and an alpha, beta-ethylenically unsaturated carboxylic acid anhydride, wherein said adduct contains carboxylic acid anhydride moieties, or (ii) a mixture of a drying or semi-drying oil and an alpha, beta-ethylenically unsaturated carboxylic acid anhydride, for a period of time and at an elevated temperature sufficient to produce a ternary adduct of said phenolic resin, said drying or semi-drying oil, and said anhydride;

b. reacting the product of step (a) with sufficient water to insure that substantially all of the anhydride groups contained in said ternary adduct are converted to carboxylic acid groups; and

c. neutralizing the product of step (b) with sufficient base to produce a water-dilutable coatings composition,

wherein the said step (a) is carried out in the presence of a catalytically effective quantity of a secondary or tertiary amine catalyst, said phenolic resin being a resole or a novolak.

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4,025,474

## POLYESTER COATING COMPOSITIONS COMPRISING CROSS-LINKED POLYMERIC MICROPARTICLES

Samuel Porter, Jr., Tarentum, and Bruce N. McBane, Gibsonia, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed June 2, 1975, Ser. No. 583,313

Int. Cl.² C09D 3/52

U.S. Cl. 260—22 CQ 24 Claims

1. In a polyester coating composition comprising a solution or dispersion of a hydroxyfunctional oil-modified or oil-free polyester resin and an aminoplast resin, the improvement which comprises the addition thereto of from about 2 percent to about 50 percent of crosslinked polymeric microparticles formed by the free radical addition copolymerization of from about 0.5 percent to about 15 percent of an alpha, beta-ethylenically unsaturated monocarboxylic acid, at least one other copolymerizable ethylenically unsaturated monomer, and from about 0.5 percent to about 15 percent of a crosslinking monomer selected from the group consisting of epoxy group-containing compounds, alkylenimines, organo-alkoxysilanes and mixtures thereof in the presence of a dispersing liquid which is a solvent for the polymerizable monomers but a non-solvent for the resultant polymer, and a dispersion stabilizer containing at least two segments of which one segment is solvated by said dispersing liquid and a second segment is of different polarity than said first segment and is relatively insoluble in said dispersing liquid.

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4,025,475

## HIGH SOLID CONTENT ALKYD RESIN COMPOSITIONS COMPRISING (1-METHYL-2-VINYL)4,6-HEPTADIENYL-3,8-NONADIENOATE

Satoru Enomoto, Fujisawa; Hitoshi Takita, Tokyo; Hisayuki Wada, Tokyo; Yutaka Mukaida, Tokyo, and Mikiro Yanaka, Matsudo, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 10, 1975, Ser. No. 611,917

Claims priority, application Japan, Sept. 18, 1974, 49-106629

Int. Cl.² C09D 3/66, 3/68

U.S. Cl. 260—22 CB 7 Claims

1. High solid content alkyd resin compositions comprising 90 to 10 percent by weight of alkyd resin and 10 to 90 percent by weight of (1-methyl-2vinyl)4,6-heptadienyl-3,8-nonadienoate.

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4,025,476

## TRAFFIC PAINT METHOD AND COMPOSITION

David R. Miller, Hughesville, Pa., and Jack D. Wolfe, deceased, late of Hughesville, Pa. (by Edith B. Wolfe, executrix), assignors to Prismo Universal Corporation, Rockville, Md.

Filed Oct. 3, 1975, Ser. No. 619,355

Int. Cl.² C09D 3/66

U.S. Cl. 260—22 CQ 16 Claims

1. A method of applying a rapid drying marking composition comprising applying at ambient temperature a traffic paint composition onto a roadway surface, the traffic paint composition, expressed in weight percentage, containing:

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resin binder 16–22

-continued

| | |
|---|---|
| pigment(s) | 47–48 |
| pigment volume concentration (PVC) | 46–59 |
| solvent system: | |
| boiling point 190–141° F. | 5–11 |
| boiling point 140–106° F. | 12–17 |
| boiling point 105–90° F. | 2–28 |
| boiling point greater than 225° F. | 0–12 |
| solids content | 67.5–75.5 |

and allowing the thus applied paint composition to dry to a track-free state at ambient temperature in a period of 60 seconds or less.

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**4,025,477**

**ACRYLATED EPOXIDIZED SOYBEAN OIL URETHANE DERIVATIVES**

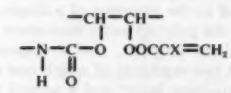
**George W. Borden, Niantic, Conn.; Oliver W. Smith, South Charleston, W. Va., and David J. Trecker, Old Lyme, Conn., assignors to Union Carbide Corporation, New York, N.Y.**

**Division of Ser. No. 343,694, March 22, 1973, which is a division of Ser. No. 103,912, Jan. 4, 1971, abandoned. This application Nov. 6, 1974, Ser. No. 521,510**

**Int. Cl.² C08G** *18/04, 18/06*

**U.S. Cl. 260—23 EP** **6 Claims**

1. Acrylated epoxidized soybean oil urethane compounds having in the molecule the group:



wherein X is hydrogen or methyl, said compounds being the reaction product of:

A. epoxidized soybean oil reacted with acrylic acid or methyacrylic acid and

B. an organic isocyanate.

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**4,025,478**

**HOT MELT ADHESIVE**

**Lawrence D. Jurrens, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Feb. 7, 1975, Ser. No. 547,942**

**Int. Cl.² C08L** *91/00*

**U.S. Cl. 260—27 R** **12 Claims**

1. A hot melt adhesive composition comprising

1. a solid polybutadiene having vinyl content of less than 15 percent which has been produced from an unhydrogenated polybutadiene having a vinyl content of at least 50 percent by subsequent hydrogenation and

2. an amount of a tackifying compound sufficient to produce an adhesive composition having a viscosity at 350° F. of from about 1,500 to about 1 million cps.

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**4,025,479**

**REMOVAL OF SULFURIC ACID COMPOUNDS**

**Albert Jung, Taunusstein; Johannes Reese; Kurt Hultzsch, both of Wiesbaden-Biebrich, and Wolfgang Hesse, Breckenheim, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Germany**

**Continuation-in-part of Ser. No. 164,129, July 19, 1971, Pat. No. 3,954,690, which is a continuation-in-part of Ser. No. 776,249, Nov. 15, 1968, abandoned. This application Sept. 16, 1975, Ser. No. 613,882**

**Claims priority, application Germany, Nov. 17, 1967, 1643829; Mar. 3, 1968, 1768068; Aug. 3, 1968, 1793116**

**Int. Cl.² C08L** *93/00*

**U.S. Cl. 260—27 BB** **16 Claims**

1. A process for removing discoloring amounts of color forming sulfur compounds from the reaction products of a reaction mixture containing a polybutadiene reduceable acid-reacting sulfur-containing ingredient as a reagent, reaction product or catalyst, the improvement comprising (1) reacting the reactants in the reaction mixture, (2) then reacting said acid reacting sulfur containing ingredient in the reacted mixture with an amount of polybutadiene which is sufficient to react with and reduce all of said acid-reacting sulfur containing ingredients and form volatilizable reduction products of all of said sulfur containing ingredients and (3) then heating and maintaining the reacted mixture until no more gaseous products are formed at a temperture between about ambient temperature and about 320° C that is sufficient to substantially reduce, volatilize and remove all of said sulfur containing reduction products to thereby provide an ultimate reaction product that is free of strong discoloring amounts of said color forming sulfur compounds.

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**4,025,480**

**DRY BLENDING SYSTEM FOR POLYETHYLENE FLUFF AND ADDITIVES**

**Olaf E. Larsen, Dallas, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Nov. 19, 1975, Ser. No. 633,313**

**Int. Cl.² C08L** *91/06*

**U.S. Cl. 260—28.5 A** **10 Claims**

1. A method for incorporating additives with a solid olefin polymer fluff which comprises compounding said polymer fluff and at least one dry additive, introducing the resulting mixture to a disc-type mill while simultaneously introducing a liquid slip agent to said mill, mixing said polymer fluff, said additive and said slip agent in said mill and withdrawing therefrom the resulting blend.

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**4,025,481**

**METHOD FOR THE PREPARATION OF AQUEOUS DISPERSIONS OF POLYTETRAFLUOROETHYLENE WITH HALOGENATED HYDROCARBON AS STABILIZING AGENT**

**Claude Tournut, Saint-Genis Laval, and Edouard Grimaud, Oullins, both of France, assignors to Produits Chimiques Ugine Kuhlmann, France**

**Continuation of Ser. No. 433,711, Jan. 16, 1974, abandoned, which is a continuation of Ser. No. 218,599, Jan. 17, 1972, abandoned. This application May 22, 1975, Ser. No. 580,033**

**Claims priority, application France, Jan. 28, 1971, 71.02800**

**Int. Cl.² C08L** *27/18*

**U.S. Cl. 260—29.6 F** **9 Claims**

1. A method for the preparation of mechanically stable, concentrated, aqueous dispersions of polytetrafluoroethylene which comprises polymerizing tetrafluoroethylene dispersed in an aqueous medium containing a polymerization initiator and an emulsifying agent, in the presence of from about 10 to about 10,000 parts per million by weight of said aqueous medium of a stabilizing agent selected from the group consisting of a saturated halogenated acyclic hydrocarbon containing less than about 20 carbon atoms, an unsaturated halogenated acyclic hydrocarbon containing less than about 20 carbon atoms which is not copolymerizable with the tetrafluoroethylene under the reaction conditions, or a mixture of said halogenated hydrocarbons.

4,025,482

## CROSS-LINKED ETHYLENE MALEIC ANHYDRIDE INTERPOLYMERS

Shengen Hu, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 494,447, Aug. 5, 1974, Pat. No. 3,951,926.
This application Jan. 23, 1976, Ser. No. 651,865
Int. Cl.² C08F 8/44, 267/04; C08J 3/04
U.S. Cl. 260—29.6 T 2 Claims

1. A composition useful as a thickener for textile printing pastes which comprises an aqueous dispersion of from about 0.1 percent to about 15 percent by weight of a salt selected from the group consisting of alkali metal, ammonium and amine salts of a cross-linked interpolymer of substantially equimolar portions of maleic anhydride and ethylene and from about 0.35 to about 0.55 mol percent of triallyl isocyanurate based upon the maleic anhydride monomer.

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4,025,483

## STABILIZING AQUEOUS TITANIUM DIOXIDE PIGMENT SLURRIES BY BLENDING THEREWITH PLASTIC PARTICLES

Alexander Ramig, Jr., Brunswick, Ohio, assignor to SCM Corporation, New York, N.Y.

Filed Oct. 6, 1975, Ser. No. 619,801
Int. Cl.² C08L 25/06
U.S. Cl. 260—29.6 MM 10 Claims

1. A process for improving the stability of an aqueous slurry of titanium dioxide pigment having average particle size of less than about 5,000 A, which comprises:

blending therewith water-insoluble, nonfilm-forming polymer particles of latex addition polymers of polymerizable ethylenically unsaturated monomers, said polymer particles having average particle size of about 1,000 A to about 10,000 A and having a glass transition temperature (Tg) greater than about 30° C., said blend comprising by weight from about 10% to about 50% water and at least about 10% of said polymer particles.

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4,025,484

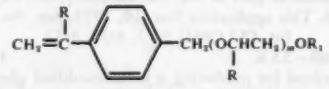
## POLYMERIC STABILIZED DISPERSIONS

Syamalarao Evani; Dennis McKeever, and Russell J. Raymond, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 591,202, June 27, 1975, abandoned. This application Sept. 7, 1976, Ser. No. 721,020
Int. Cl.² C08K 5/01, 5/05, 5/07
U.S. Cl. 260—33.6 UA 6 Claims

1. A dispersion of finely divided particulate solids in an organic liquid in which the solids are insoluble containing a sufficient amount of a polymeric dispersant to stabilize the dispersion, said dispersant having an average degree of polymerization of about 10 to 100 and comprising in interpolymerized form

a. a monoalkenyl aromatic monomer,
b. a vinyl acid or anhydride, and
c. a vinyl benzyl monomer having the formula



where R may be hydrogen or methyl, $m$ is about 10 to 100 and $R_1$ is a hydrophobic group of about 10 to 22 carbons; and wherein the molar amounts of monomer (a) and monomer (c) per mole of monomer (b) range from about 0.5 to 0.9 and 0.1 to 0.5, respectively.

4,025,485

## ORGANOPOLYSILOXANE COMPOSITIONS

Iehiro Kodama; Yoshiaki Kudo; Takahide Kobori, and Tokue Kozima, all of Annaka, Japan, assignors to Shin-Etsu Chemical Company Limited, Tokyo, Japan

Filed July 20, 1976, Ser. No. 707,077
Claims priority, application Japan, July 24, 1975, 50-90635
Int. Cl.² C08L 83/04
U.S. Cl. 260—37 SB 14 Claims

1. An organopolysiloxane composition comprising

A. 100 parts by weight of a mixture consisting of
   a. an organopolysiloxane having at least two vinyl groups directly bonded to the silicon atoms in a molecule and
   b. an organohydrogenpolysiloxane having at least three hydrogen atoms directly bonded to the silicon atoms, the amount of the organohydrogenpolysiloxane being sufficient to provide at least one and a half hydrogen atoms directly bonded to the silicon atoms per vinyl group of organopolysiloxane (a),
B. from 5 to 50 parts by weight of a silica filler,
C. from 0.5 to 40 parts by weight of zinc carbonate,
D. from 0.05 to 10 parts by weight of ceric oxide, and
E. a catalytic amount of platinum or a platinum compound.

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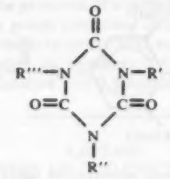
4,025,486

## HYDROXYPHENYLALKYLENEYL ISOCYANURATE/PENTAERYTHRITOL PHOSPHITE COMBINATIONS AS ULTRAVIOLET LIGHT STABILIZERS FOR POLYOLEFINS

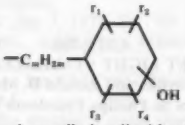
Jack Conrad Gilles, Shaker Heights, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Continuation-in-part of Ser. No. 406,344, Oct. 15, 1973, Pat. No. 3,909,491. This application Sept. 29, 1975, Ser. No. 617,945
Int. Cl.² C08K 5/34, 5/52
U.S. Cl. 260—45.8 NT 14 Claims

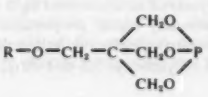
7. A composition comprising (A) a polyolefin polymer and (B) as the only ultraviolet light stabilizer, a combination of (1) a hydroxyphenylalkyleneyl isocyanurate of the formula



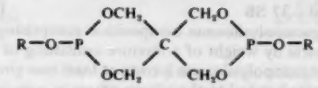
wherein R′ is a hydroxyphenylalkyleneyl radical of the formula



where $m$ is 1 to 4, $r_1$ is an alkyl radical having 1 to 18 carbon atoms and is positioned immediately adjacent to the hydroxyl group on the ring; $r_2$, $r_3$, and $r_4$ are hydrogen or an alkyl radical containing 1 to 18 carbon atoms; and R″ and R‴ are hydrogen, an alkyl radical containing 1 to 18 carbon atoms, or are the same as R′, and (2) a pentaerythritol phosphite compound selected from the group consisting of (a) compounds of the formula



wherein R is selected from the group consisting of an aliphatic group containing 1 to about 20 carbon atoms, a cycloalkyl radical containing 5 to about 8 carbon atoms in the ring, and an aryl, alkaryl, or aralkyl group of 6 to about 14 carbon atoms in the group, (b) compounds of the formula



wherein R is defined as above, and wherein the said hydroxyphenylisocyanurate compound is used in a weight ratio of about 10:1 to 1:10 to the pentaerythritol phosphite compound.

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## 4,025,487
## COMPOSITIONS STABILIZED WITH 4-AROYLAMIDO-2-ALKYL-6-T-BUTYLPHENOLS

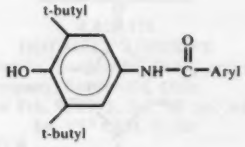
**Martin Dexter, Briarcliff Manor, and Martin Knell, Ossining, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Division of Ser. No. 377,875, July 9, 1973, abandoned, which is a continuation-in-part of Ser. No. 136,617, April 22, 1971, abandoned, which is a continuation-in-part of Ser. No. 820,644, April 30, 1969, abandoned. This application June 30, 1975, Ser. No. 591,560**

**Int. Cl.² C08K** *5/20*

**U.S. Cl. 260—45.9 NC** **5 Claims**

1. A composition of matter comprising a diene rubber stabilized against oxidative deterioration with 0.05% to 2% by weight of the rubber of a compound having the formula



wherein aryl is phenyl, naphthyl or alkyl substituted phenyl where alkyl has up to 9 carbon atoms.

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## 4,025,488
## ULTRAVIOLET LIGHT STABILIZED α-OLEFINS

**James S. Dix, Greenville, and Ronald D. Mathis, Taylors, both of S.C., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Continuation-in-part of Ser. No. 113,651 Feb. 8, 1971, abandoned. This application Feb. 14, 1975, Ser. No. 549,888**

**Int. Cl.² C08K** *5/37*

**U.S. Cl. 260—45.75 N** **40 Claims**

1. An improved ultraviolet light stabilized α-olefin polymer composition which comprises: (a) polymer prepared from α-olefin monomers having 2 to 10 carbon atoms per molecule; and (b) from 0.05 to about 10 parts by weight per 100 parts by weight of said polymer of an ultraviolet light stabilizing combination of approximately equal proportions of (1) 2,2′-thiobis(4t-octylphenolato)cyclohexyldiethanolamine nickel (II) and (2) 2′,4′-di-t-butylphenyl 3,5-di-t-butyl-4-hydroxybenzoate.

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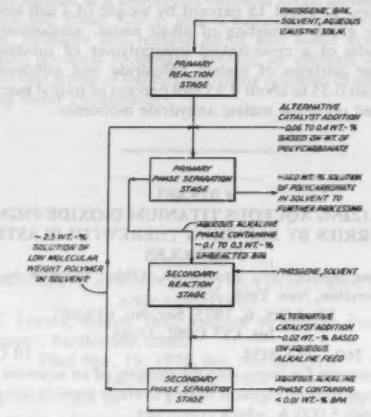
## 4,025,489
## UTILIZATION OF BISPHENOL-A FROM THE ALKALINE PHASE GENERATED IN THE PRODUCTION OF POLYCARBONATES

**John V. Bailey; Thomas H. Cleveland, both of New Martinsville, W. Va., and Emanuel W. Wirfel, Coraopolis, Pa., assignors to Mobay Chemical Corporation, Pittsburgh, Pa.**

**Filed Jan. 27, 1975, Ser. No. 544,246**

**Int. Cl.² C07C** *68/02, 69/96;* **C08G** *63/62*

**U.S. Cl. 260—47 XA** **17 Claims**




1. A process for utilizing unreacted bisphenol-A in the aqueous alkaline phase generated in the production of polycarbonate resins in a main reaction stream comprising contacting said aqueous alkaline phase with phosgene in a secondary reaction stream in the presence of an organic solvent whereby a low molecular weight polymer having chlorocarbonate end groups is formed in the solvent via the reaction between the phosgene and the bisphenol-A and separating the solvent solution of the low molecular weight polymer from the aqueous alkaline phase.

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## 4,025,490
## METHOD OF PRODUCING METAL MODIFIED PHENOL-ALDEHYDE NOVOLAK RESINS

**Frederick D. Weaver, Chillicothe, Ohio, assignor to The Mead Corporation, Dayton, Ohio**

**Continuation-in-part of Ser. No. 528,039, Nov. 11, 1974, abandoned. This application Nov. 10, 1975, Ser. No. 630,689**

**Int. Cl.² C08G** *8/12, 8/28, 8/32*

**U.S. Cl. 260—53 R** **11 Claims**

1. A method for producing a metal-modified phenol-aldehyde novolak resin comprising the steps of melting together with mixing, a composition consisting essentially of a one to three carbon atom alkanoic salt of a metal selected from copper, zinc, cadmium, aluminum, indium, tin, chromium, cobalt and nickel, an ammonium compound or ammonia and a phenol-aldehyde novolak resin material.

4,025,491

## POLY(TETRAMETHYLENE DIBROMOTEREPHTHALATE) YARNS

James P. Nelson, Woodridge, Ill., and Alfred Steitz, Jr., deceased, late of Batavia, Ill. (by Margaret Marie Steitz, executrix), assignors to Standard Oil Company (Indiana), Chicago, Ill.

Division of Ser. No. 479,473, June 14, 1974, Pat. No. 3,966,682, which is a continuation-in-part of Ser. No. 263,195, June 15, 1972, abandoned. This application Aug. 21, 1975, Ser. No. 606,504

Int. Cl.² D02G 3/04

U.S. Cl. 260—75 5 Claims

1. A fire-retardant yarn comprising a polyester fiber wherein said polyester consists essentially of a dicarboxylic acid component and 1,4-butanediol component and said dicarboxylic acid component comprises from 10 to 100 mole percent 2,5-dibromoterephthalic acid moieties and correspondingly 90 to 0 mole percent terephthalic acid moieties.

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4,025,492

## THERMOPLASTIC COPOLYESTERS AND A PROCESS FOR THEIR PRODUCTION

Rudolf Binsack; Ludwig Bottenbruch, both of Krefeld, and Hans Hespe, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed June 24, 1975, Ser. No. 589,912

Claims priority, application Germany, June 28, 1974, 2431072

Int. Cl.² C08G 63/18, 63/26

U.S. Cl. 260—75 R 3 Claims

1. A thermoplastic highly crystalline, linear, statistical copolyester produced by the process of melt condensing 1 mol of a dicarboxylic acid component of which at least 90 mol % consists of terephthalic acid or an ester forming derivative thereof with 1.1 to 2.5 mols of a diol component of which from 90 to 99.5 mol % consists of 1,3-propanediol or 1,4-butanediol and from 10 to 0.5 mol % thereof consists of a codiol selected from the group consisting of 2-ethyl-1,3-propanediol, 3-methyl-1,5-pentanediol and 2-ethyl-2-methoxymethyl-1,3-propanediol and thereafter continuing said condensation in the solid phase either under an inert gas or under vacuum at a temperature of from 5° to 50° C below the polyester melting temperature until an intrinsic viscosity of at least 0.6 dl/g is obtained, said intrinsic viscosity being measured in a 1:1 mixture of phenol and tetrachloroethane at a temperature of 25° C.

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4,025,493

## POLYAMIDES AND POLYESTERS FROM PHENYL-SUBSTITUTED ALKANE DIOIC ACIDS

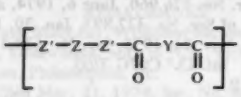
Charles A. Drake, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sept. 29, 1975, Ser. No. 617,761

Int. Cl.² C08G 63/18, 69/26

U.S. Cl. 260—75 R 7 Claims

1. A polymer defined by having repeating units



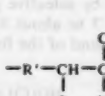
(XV)

wherein Y is individually selected from the group consisting of

(XVIa)

(XVIb)

and



(XVIc)

-continued

Z' is —O— or .

Z is a divalent radical individually selected from the group of substituted or unsubstituted alkylene, cycloalkylene, arylene, alkylarylene, alkylenearylene, alkylcycloalkylene, alkylenecycloalkylene and cycloalkylenearylene radicals having 2 to 20 carbon atoms per radical, and wherein R is n-propylene, R' is ethylene, and Q is phenyl.

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4,025,494

## PROCESS FOR PREPARING FILM- AND FIBER-FORMING POLY(1,4-BENZAMIDE)

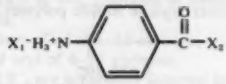
Paul Winthrop Morgan, West Chester, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 8, 1975, Ser. No. 611,215

Int. Cl.² G08G 69/12

U.S. Cl. 260—78 A 9 Claims

1. A process for preparing high molecular weight fiber- and film-forming poly(1,4-benzamide) comprising reacting a p-aminobenzoyl halide salt of the formula



wherein $X_1$ and $X_2$ represent halogen radicals in a liquid reaction medium selected from the group consisting of chloro-, bromo-, nitro- and o-dichlorobenzene, n-pentane, n-hexane, n-heptane and cyclohexane, acetonitrile, propionitrile and benzonitrile, acetone, methyl ethyl ketone and ethyl acetate, diethyl ether, ethylene glycol dimethyl ether and diethylene glycol dimethyl ether, methylene chloride, carbon tetrachloride and chlorobromethane, 1-chloro-2-bromoethane, ethylene dichloride, 1,1,2-trichloroethane and unsym.-trichlorotrifluoroethane in the presence of a tertiary amine acid acceptor selected from the group consisting of ethyl diisopropylamine and heterocyclic tertiary amine acid acceptors selected from the group consisting of pyridine, 2,6-lutidine, 2,4-lutidine, 2,5-lutidine, 3,5-lutidine and 2,3-lutidine.

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4,025,495

## PREPARATION OF ORGANIC POLYSULFIDE POLYMERS USING HEAVY RESIDUES FROM VINYLCHLORIDE MANUFACTURE

Fernand Peerts, Heverlee, and Yvon DeLaunois, Tessenderlo, both of Belgium, assignors to Tessenderlo Chemie S.A., Tessenderlo, Belgium

Filed July 7, 1975, Ser. No. 593,385

Claims priority, application France, July 11, 1974, 74.24082

Int. Cl.² C08G 75/16

U.S. Cl. 260—79.1 16 Claims

1. A process for abating a waste disposal problem in the manufacture of vinyl chloride wherein 1,2 dichlorethane is an intermediate and a heavy residue is recovered as still bottoms, from the purification by distillation of dichloroethane and/or vinyl chloride having an organic-origin chloride content ranging between 55 and 80% by weight, said process comprising reacting said heavy residue at 50° to 100° C., in aqueous medium with an alkali metal or an alkaline earth metal polysulfide, the proportion of polysulfide being equal at least to 30% by weight of the molar theoretical quantity, the average sulfur rank of polysulfide being more than 1 and up to and including 5, the pH of the reaction medium not exceeding 10.5 when the reaction is completed, and the obtained precip-

itate being separated from the reaction mother liquor, said precipitate being organic polysulfide polymers containing 4–80% by weight of sulfur.

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4,025,496

## SEQUENCED ADDITION OF COMPONENTS IN POLY(ARYLENE SULFIDE) PRODUCTION

**Kenneth L. Anderson, Bartlesville, Okla., and Donald G. Kuper, Borger, Tex., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Oct. 10, 1975, Ser. No. 621,448**
**Int. Cl.² C08G *75/16***
**U.S. Cl. 260—79.1** **13 Claims**

1. A method for producing arylene sulfide polymer comprising:

a. preparing a first composition comprising at least one alkali metal bisulfide and at least one organic amide;

b. admixing at least one alkali metal hydroxide with said first composition to form a second composition;

c. admixing at least one p-dihalobenzene with at least a portion of said second composition to produce a third composition; and

d. subjecting said third composition to polymerization conditions for a time sufficient to form a reaction mixture comprising arylene sulfide polymer that can be subjected to distillation and extraction with water and readily filtered to recover arylene sulfide polymer.

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4,025,497

## ETHYLENE-OLEFIN-ALKENYL NORBORNENE ELASTOMERS

**Giulio Natta; Alberto Valvassori, both of Milan, Italy; Guido Sartori, Roselle, N.Y., and Nazzareno Cameli, Milan, Italy, assignors to Montecatini Edison S.p.A., Milan, Italy**

**Continuation of Ser. No. 876,198, Dec. 2, 1969, abandoned, which is a continuation of Ser. No. 642,325, May 31, 1967, abandoned, which is a continuation-in-part of Ser. No. 434,677, Feb. 23, 1965, abandoned. This application Sept. 18, 1970, Ser. No. 73,682**
**Claims priority, application Italy, Feb. 25, 1964, 4141/64; June 1, 1966, 18570/66**
**The portion of the term of this patent subsequent to Jan. 13, 1987, has been disclaimed.**
**Int. Cl.² C08F *27/06*; C08D *1/14*, *3/04***
**U.S. Cl. 260—79.5 B** **3 Claims**

1. Synthetic rubbers which are sulfur-vulcanized terpolymers consisting of high molecular weight, substantially linear, amorphous macromolecules made up of randomly distributed polymerized units of ethylene, polymerized units of at least one aliphatic alpha-olefin having the formula $CH_2 = CHR$ in which R is an alkyl group containing 1 to 6 carbon atoms, and polymerized units of 2-methallyl-norbornene-5 each of which is unsaturated, said terpolymers containing from about 5% to about 75% of polymerized ethylene, from about 5% to about 95% of polymerized aliphatic alpha-olefin, and from about 0.1% to about 20% of polymerized 2-methallyl-norbornene-5.

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4,025,498

## VESSEL RESIDENCE TIME CONTROL

**Russell A. Buss, Bartlesville, Okla., and Jerald N. Linsley, Houston, Tex., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed July 1, 1974, Ser. No. 484,691**
**Int. Cl.² C08F *6/00***
**U.S. Cl. 260—95 A** **22 Claims**

1. A method for maintaining a desired residence time for material within a vessel having an inlet, an outlet, and means for moving material from said inlet to said outlet, said method comprising:

establishing a delivery flow signal representative of the flow rate of said material from the outlet of said vessel;

establishing an inlet level signal representative of the level of material within said vessel adjacent the inlet thereof;

establishing an outlet level signal representative of the level of material within said vessel adjacent the outlet thereof;

establishing a residence time set point signal representative of the desired residence time of material within said vessel;

controlling the rate at which material is delivered to the inlet of said vessel in response to said delivery flow signal, said inlet level signal, and said residence time set point signal to provide a desired inventory of said material within said vessel; and

controlling the rate at which said material is moved from the inlet of said vessel to the outlet of said vessel in response to said delivery flow signal, said outlet level signal and said residence time set point signal to provide a desired residence time of said material within said vessel.

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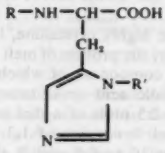
4,025,499

## PREPARATION OF HISTIDINE-CONTAINING PEPTIDES

**Alford Mitchell Thomas, Gurnee, Ill., assignor to Abbott Laboratories, North Chicago, Ill.**

**Filed Nov. 3, 1975, Ser. No. 628,164**
**Int. Cl.² C07C *103/52***
**U.S. Cl. 260—112.5 R** **5 Claims**

1. The process of preparing a di- or polypeptide of the formula



wherein R′ is hydrogen or methyl and R represents the acyl moiety of an aminoacid or aminoacid chain which, in turn, carries a blocking group at the N-terminus and wherein any functional groups may be protected by carrying a moiety that can be removed chemically without affecting any of the aminoacid links, consisting essentially in stirring His or (3-Me) His with one molar equivalent of an active ester of the aminoacid of formula R-OH in the presence of an inert reaction medium and at least one molar equivalent of triethylamine for at least 1 hour at a temperature below 30° C and evaporating said reaction medium.

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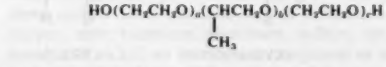
4,025,500

## PREPARATION OF ALBUMIN BY FRACTIONATION OF BLOOD PLASMA OR SERUM

**Luis A. Garcia, Huntington Beach, and Guido A. Ordonez, Laguna Beach, both of Calif., assignors to Baxter Laboratories, Inc., Deerfield, Ill.**

**Continuation of Ser. No. 476,960, June 6, 1974, abandoned, which is a division of Ser. No. 327,893, Jan. 30, 1973. This application Nov. 21, 1975, Ser. No. 634,139**
**Int. Cl.² C07G *7/00***
**U.S. Cl. 260—112 B** **4 Claims**

1. The process of preparing a concentrated albumin-containing therapeutic blood fraction from coagulation factor-depleted blood serum and plasma comprising adjusting to a protein concentration of from about 0.5 to about 2.5% followed by selective precipitation by admixing at pH of from about 7 to about 8 with from about 10 to about 20% of a compound of the formula



wherein *a* and *c* are integers such that the hydrophile portion represented by $(CH_2CH_2O)$ constitutes at least about 50% of the molecule and *b* is an integer such that the hydrophobic portion represented by

has a molecular weight of at least about 950, separating the resulting precipitate from the supernatant, increasing the concentration of said copolymer in the supernatant to from about 17 to about 27% at a pH of from about 7 to about 8, separating the resulting precipitate from the supernatant, and precipitating the desired concentrated albumin-containing fraction from the latter supernatant by the steps consisting essentially of adjusting said latter supernatant to a temperature of from about 0° to about 10° C and to a pH of from about 4 to about 5 with acetate buffer, and then collecting the resulting precipitate as the desired concentrated albumin-contacting fraction.

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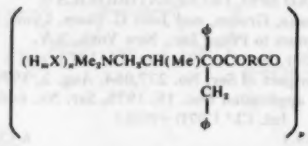
## 4,025,501
## POLYPEPTIDE PROPOXYPHENE DERIVATIVES FOR IMMUNOASSAY REAGENTS

**Richard K. Leute, Mountain View, Calif., assignor to Syva Company, Palo Alto, Calif.**

**Filed Mar. 20, 1975, Ser. No. 560,079**
**Int. Cl.² C07G 7/00**
**U.S. Cl. 260—121** **8 Claims**

1. Compounds of the formula:



wherein:

R is a bond or divalent aliphatic radical having from 0 to 1 site of ethylenic unsaturation and of from 1 to 5 carbon atoms;

X is an anion of a strong mineral acid;

*m* is equal to the valence of X;

*n* is 0 to 1 divided by *m;*

Z is a polypeptide residue; and

*p* is equal to at least 1 and not greater than the molecular weight of Z divided by 500;

wherein the bonds to Z are through an amide link.

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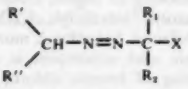
## 4,025,502
## SECONDARY-ALIPHATIC α-SUBSTITUTED AZOALKANES

**Ronald Edward MacLeay, Williamsville, and Chester Stephen Sheppard, Tonawanda, both of N.Y., assignors to Pennwalt Corporation, Philadelphia, Pa.**

**Filed Mar. 21, 1974, Ser. No. 453,447**
**Int. Cl.² C07C 107/02**
**U.S. Cl. 260—192** **12 Claims**

I.



wherein:

R′ and R″ are separately selected from alkyl of 1–12 carbons, cycloalkyl of 3–12 carbons, and aralkyl of 7–12 carbons, or join to form cycloalkyl of 3–12 carbons, and R″ is further selected from aryl of 6–14 carbons;

$R_1$ and $R_2$ are separately selected from alkyl of 1–8 carbons, cycloalkyl of 3–12 carbons, and aralkyl of 7–12 carbons, or join to form cycloalkyl of 4–12 carbons, and $R_2$ is further selected from aryl of 6–14 carbons;

X is selected from -Cl, -Br, -CN, $-C(=O)NH_2$, $-C(=NOH)NH_2$, -OH, $-OR_3$, $-OC(=O)OR_3$, $-OOR_3$, $-SR_6$, $-N_3$, -SCN, -NCX′, $-NHC(=X')OR_3$, $-NHC(=X')N(R_8)R_9$, $-NHC(=X')NHNHC(=X')R_4$, $-NHC(=X')NHN(R_8)C(=X')N(R_8)R_9$, $-NHC(=X')N(NH_2)R_{10}$, $-NHC(=X')NHNHR_{16}$, $-NHC(=X')NHN(R'_8)R'_9$, $-NHC(=X')NHNHC(=X')X'R_3$,

X′ is oxygen or sulfur;

$R_3$ and $R_4$ are separately selected from alkyl of 1–12 carbons, cycloalkyl of 3–12 carbons, aralkyl of 7–12 carbons, and aryl of 6–14 carbons, and $R_4$ is further selected from hydrogen;

$R_5$ is tertiary alkyl of 4–12 carbons or tertiary phenalkyl of 9–12 carbons;

$R_6$ is selected from alkyl of 1–12 carbons, cycloalkyl of 3–12 carbons, and aryl of 6–14 carbons;

$R_8$, $R_9$, $R'_8$ and $R'_9$ are separately selected from alkyl of 1–8 carbons, cycloalkyl of 3–12 carbons, aralkyl of 7–12 carbons, and aryl of 6–14 carbons or $R_8$ and $R_9$ or $R'_8$ and $R'_9$ taken together form alkylene of 3–11 carbons, and $R_8$ and $R_9$ are further selected from hydrogen;

$R_{10}$ is primary or secondary alkyl of 1–12 carbons or cycloalkyl of 3–12 carbons;

$R_{15}$ is aryl of 6–10 carbons; and

$R_{16}$ is selected from hydrogen, tertiary alkyl of 4–8 carbons, tertiary aralkyl of 9–12 carbons, and aryl of 6–14 carbons.

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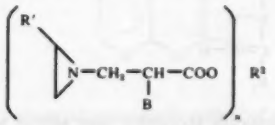
## 4,025,503
## MANUFACTURE OF AZIRIDINECARBOXYLIC ACID ESTERS

**Felix Miksovsky, and Rolf Fikentscher, both of Ludwigshafen, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany**

**Filed July 5, 1974, Ser. No. 486,216**
**Claims priority, application Germany, July 7, 1973, 2334656**
**Int. Cl.² C07D 203/18**
**U.S. Cl. 260—239 E** **10 Claims**

1. A process for the manufacture of compounds of the formula

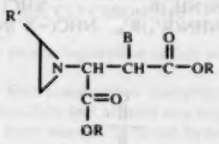


(I)

where B is hydrogen or methyl, R′ is hydrogen or a $C_1$ to $C_5$ alkyl, $R^2$ is the n-valent radical of an n-valent primary alcohol other than methanol, ethanol or propanol and *n* is an integer of from 2 to 5 and is equal to the number of valences of the radical $R^2$, which comprises reacting a compound of formula I in which *n* is 1 and $R^2$ is methyl, ethyl or propyl with an n-valent primary alcohol other than methanol, ethanol or propanol, at a temperature of from 100° to 145° C in the

presence of a basic transesterification catalyst and a paraffin hydrocarbon selected from the group consisting of n-octane, isooctane, a nonane, and n-decane with removal of methyl alcohol, ethyl alcohol or propyl alcohol from the esterification equilibrium by distillation.

6. A process for the manufacture of ethyleneiminosuccinic acid esters which comprises reacting a compound of the formula



wherein B is hydrogen or methyl, $R^1$ is hydrogen or a $C_1$ to $C_5$ alkyl and R is methyl, ethyl or propyl, with an n-valent primary alcohol other than methanol, ethanol or propanol where n is an integer of from 2 to 5, at a temperature of from 100° to 145° C in the presence of a basic transesterificaion catalyst and a paraffin hydrocarbon selected from the group consisting of n-octane, isooctane, a nonane, and n-decane with removal of methyl alcohol, ethyl alcohol or propyl alcohol from the esterification equilibrium by distillation.

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**4,025,504**

## BROAD SPECTRUM ANTIBIOTICS

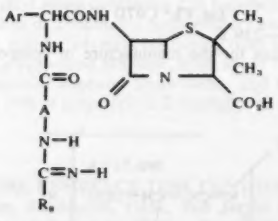
**Ernest S. Hamanaka, Groton, and John G. Stam, Lyme, both of Conn., assignors to Pfizer Inc., New York, N.Y.**

**Division of Ser. No. 424,891, Dec. 14, 1973, Pat. No. 3,951,952, which is a continuation-in-part of Ser. No. 277,064, Aug. 2, 1972, abandoned. This application Dec. 15, 1975, Ser. No. 640,899**

**Int. Cl.² C07D** *499/68, 499/70*

**U.S. Cl. 260—239.1** **3 Claims**

1. A compound selected from the group consisting of those of the formula



and the pharmaceutically acceptable basic salts or acid addition salts thereof, wherein

Ar is selected from the group consisting of phenyl, 4-hydroxyphenyl, 2-thienyl and 3-thienyl;

A is alkylidene containing from 2 to 3 carbon atoms; and

$R_9$ is selected from the group consisting of pyridyl; pyrimidinyl; pyridazinyl; pyrazinyl; benzimidazolyl; pyrryl; 2-pyrrolinyl; picolyl; substituted pyridyl wherein said substituent is selected from the group consisting of fluoro, chloro, bromo and 2,6-dichloro; and pyridyl-1-oxide.

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**4,025,505**

## AROMATIC DICARBOXAMIDES

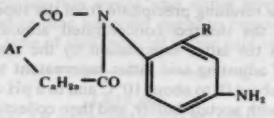
**Heinz Werner Gschwend, New Providence, N.J., and Malvin Jason Hillman, Liverpool, N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation-in-part of Ser. No. 547,063, Feb. 4, 1975, abandoned, which is a continuation-in-part of Ser. No. 449,872, March 11, 1974, Pat. No. 3,941,883. This application Nov. 13, 1975, Ser. No. 631,789**

**Int. Cl.² C07D** *209/00*

**U.S. Cl. 260—239.3 B** **7 Claims**

1. An N-(4-aminophenyl)-aromatic dicarboximide corresponding to the formula



wherein Ar is 1,2-phenylene substituted by one member selected from lower alkyl, lower alkoxy, lower alkylmercapto, lower alkyl sulfinyl, lower alkylsulfonyl, halogeno, trifluoromethyl, carboxy, lower carbalkoxy, cyano, carbamoyl, sulfamoyl, mono- or di-lower alkylcarbamoyl, mono- or di-lower alkylsulfamoyl R is lower alkyl, (hydroxy, lower alkoxy, lower alkylmercapto, lower alkylsulfinyl or lower alkylsulfonyl)-lower alkyl, halogeno or trifluoromethyl, *n* is an integer from 1 to 3 and $C_nH_{2n}$ separates Ar from CO by at least one carbon atom, or pharmaceutically acceptable salts thereof.

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**4,025,506**

## BROAD SPECTRUM ANTIBIOTICS

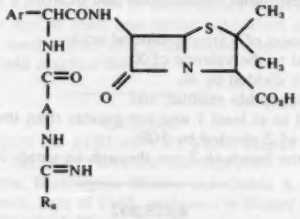
**Ernest S. Hamanaka, Groton, and John G. Stam, Lyme, both of Conn., assignors to Pfizer Inc., New York, N.Y.**

**Division of Ser. No. 424,891, Dec. 14, 1973, and a continuation-in-part of Ser. No. 277,064, Aug. 2, 1972, abandoned. This application Dec. 15, 1975, Ser. No. 640,572**

**Int. Cl.² C07D** *499/64*

**U.S. Cl. 260—239.1** **6 Claims**

1. A compound selected from the group consisting of those of the formula



and the pharmaceutically acceptable basic salts thereof, wherein

Ar is selected from the group consisting of phenyl, 4-hydroxyphenyl, 2-thienyl and 3-thienyl;

A is methylene; and

$R_6$ is selected from the group consisting of furyl; dibromo-2-furyl; thienyl; thenyl; thiazolyl; 2-benzoxazolyl; 2-benzo-γ-pyrone; 2-benzothiazolyl; 2-benzothienyl; substituted 2-benzothienyl wherein said substituent is selected from the group consisting of fluoro, chloro and bromo; isothiazolyl; oxazolyl; isoxazolyl; 1,2,3-thiadiazolyl; 2,3-dihydro-1,4-thiazinyl; benzofuryl; mono- and substituted thienyl wherein said substituent is selected from the group consisting of bromo, chloro, methoxy, methyl, sulfamoyl of the formula $R_7R_8NSO_2$— wherein $R_7$ and $R_8$ are each selected from the group consisting of hydrogen and alkyl containing from 1 to 3 carbon atoms; and

monomethyl substituted thiazolyl, isothiazolyl, oxazolyl and isoxazolyl.

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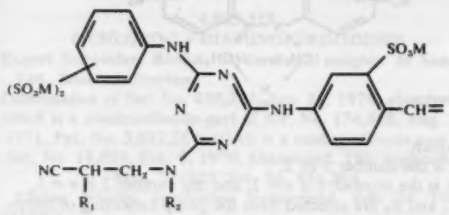
**4,025,507**

## BIS-(TRIAZINYLAMINO) STILBENE COMPOUNDS

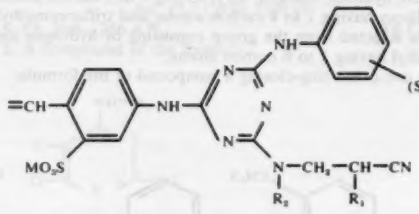
**Fritz Fleck, Bottmingen, and Hans-Rudolf Schmid, Riehen, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland**

**Filed June 25, 1974, Ser. No. 483,009**
**Claims priority, application Switzerland, July 2, 1973, 9599/73**
**Int. Cl.² C07D *403/02***
**U.S. Cl. 260—240 B** **8 Claims**

1. A compound of formula I,



I



wherein

the $R_1$'s are the same and signify hydrogen or methyl,

the $R_2$'s are the same and signify hydrogen or $C_{1-4}$alkyl, and

the M's signify hydrogen or a non-chromophoric cation.

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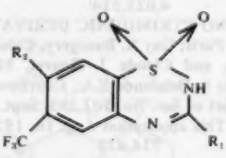
**4,025,508**

## 6-(TRIFLUOROMETHYL)-BENZOTHIADIAZINES

**Marcel Perrault, Paris, France, assignor to Serdex - Societe d'Etudes, de Recherches, de Diffusion et d'Exploitation, Puteaux, France**

**Filed July 26, 1974, Ser. No. 492,978**
**Claims priority, application France, Aug. 6, 1973, 73.28691**
**Int. Cl.² C07D *285/24***
**U.S. Cl. 260—243 D** **3 Claims**

1. A compound selected from the group consisting of compounds having the formula



(I)

in which

$R_1$ is hydrogen;

and $R_2$ is selected from bromine, fluorine, and chlorine;

and a pharmaceutically acceptable salt thereof.

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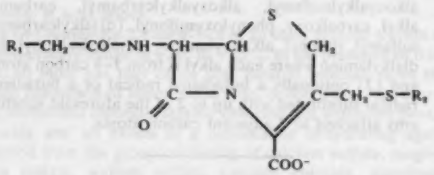
**4,025,509**

## AMINOPYRIDINIUM ACETYL CEPHALOSPORANES

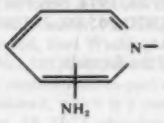
**Hans Bickel, Binningen, and Johannes Mueller, Arlesheim, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Division of Ser. No. 239,802, March 30, 1972, Pat. No. 3,929,779. This application Apr. 24, 1975, Ser. No. 571,181**
**Int. Cl.² C07D *501/20***
**U.S. Cl. 260—243 C** **5 Claims**

1. Compounds of the general formula I



wherein $R_1$ denotes an aminopyridinium radical of the formula



and $R_2$ represents a heterocyclic radical of aromatic character having 5 to 6 ring atoms which is bonded via a carbon atom to the sulphur atom and contains at least 2 nitrogen atoms and a sulphur atom said heterocyclic radical being unsubstituted or substituted by lower alkyl, lower alkoxy, lower alkylthio, cyclopentyl, cyclohexyl, unsubstituted phenyl, substituted phenyl, unsubstituted thienyl, substituted thienyl, the substituents of phenyl and thienyl being nitro, halogen, lower alkyl or lower alkoxy, and therapeutically acceptable salts of these compounds.

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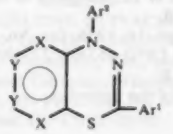
**4,025,510**

## 2,4-DIARYL[1,3,4H]THIADIAZINES FUSED TO QUINOXALINES

**Arthur John Elliott, New Castle, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Dec. 1, 1975, Ser. No. 636,792**
**Int. Cl.² C07D *285/22***
**U.S. Cl. 260—243 R** **15 Claims**

1. A compound of the formula:



wherein

$Ar^1$ is a monovalent aromatic radical of up to 10 nuclear atoms selected from the group consisting of a 6–10 carbon aryl, pyridinyl, 3-methylpyridinyl, quinolinyl, isoquinolinyl, pyridazinyl, pyrimidinyl, furyl, thienyl, pyrrolyl, thiazolyl, oxazolyl, pyrazinyl, pyrazolyl, imidazolyl, indolyl and benzothiazolyl;

$Ar^2$ is a monovalent aromatic radical selected from the group consisting of aryl of 6–10 carbon atoms, pyridazinyl, pyrimidinyl, pyrazinyl, furyl, pyrrolyl, thienyl, thiazolyl, oxazolyl, imidazolyl, indolyl, 3- or 4-pyridinyl, 3-,

4-, 5-, 6-, or 7-quinolinyl, 4-, 5-, 6-, 7-, 8-isoquinolinyl and 5-, 6-, or 7-benzothiazolyl;

each of Ar[1] and Aroptionally having up to 2 substituents selected from the group consisting of chloro, bromo, cyano, nitro, methoxy, methylthio, hydroxy, dialkylamino, dialkylsulfonamido, alkanoylamino, and alkyl, where each carbon-containing substituent is up to 4 carbon atoms;

X and Y are 1 to 2 nitrogen atoms and conversely, 3 to 2 carbon atoms, the latter having (1) up to 2 substituents which are selected from the group consisting of halogen, nitro, methoxy, methylthio, sulfonamido, cyano, carboxy, alkoxyalkylsulfamyl, alkoxyalkylcarbamyl, carbamyl, alkyl, carbalkoxy, phenyloxysulfonyl, (di)alkylcarbamyl, sulfamyl, sulfonyl, alkanoylamino, (di)alkylsulfamyl, and dialkylamino where each alkyl is from 1–4 carbon atoms, and (2) optionally a butadienyl radical or a butadienyl radical substituted with up to 2 of the aforesaid substituents attached to 2 adjacent carbon atoms.

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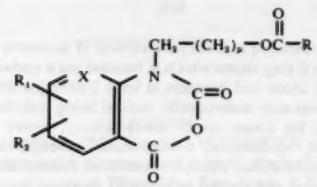
## 4,025,511
## N-ALKYLCARBONYLOXYALKYL ISATOIC AND 3-AZAISATOIE ANHYDRIDES

**Goetz E. Hardtmann, Florham Park, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.**

**Filed Dec. 24, 1974, Ser. No. 536,099**
**Int. Cl.[2] C07D** *265/00, 273/00, 295/00*
**U.S. Cl. 260—244 A** **11 Claims**

1. A compound of the formula:



wherein

R is alkyl of 1 to 4 carbon atoms,

*p* is 1 to 3,

X is =CH— or =N—, and when X is =CH—

each of $R_1$ and $R_2$ is hydrogen, fluoro, chloro, bromo, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms; and when X is =N— $R_1$ is hydrogen and $R_2$ is hydrogen or alkyl of 1 to 4 carbon atoms.

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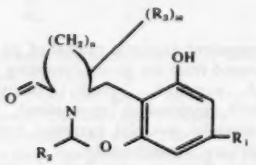
## 4,025,512
## 6a-AZACANNABINOIDS

**Harold Elmer Zaugg, Lake Forest, and David Lloyd Arendsen, Libertyville, both of Ill., assignors to Abbott Laboratories, North Chicago, Ill.**

**Filed Apr. 14, 1976, Ser. No. 676,779**
**Int. Cl.[2] C07D** *265/00, 273/00, 295/00*
**U.S. Cl. 260—244 R** **13 Claims**

1. A compound of the formula



wherein $n = 2$ or 3; $R_1$ is $C_3$–$C_{20}$ alkyl or aralkyl; $R_2$ is loweralkyl or phenyl; and $R_3$ is H or replaces the hydrogens in $(CH_2)_n$ with $CH_3$; and *m* is 1, 2 or 4.

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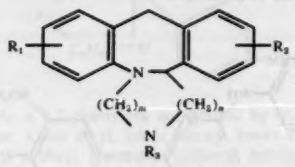
## 4,025,513
## SYNTHESIS FOR THE PREPARATION OF TETRACYCLIC COMPOUNDS

**Jacques Olivie, Gisors, France, assignor to Akzona Incorporated, Asheville, N.C.**

**Filed Feb. 6, 1975, Ser. No. 547,680**
**Claims priority, application Netherlands, Feb. 9, 1974, 7401807**
**Int. Cl.[2] C07D** *239/70, 241/38*
**U.S. Cl. 260—251 A** **4 Claims**

1. Process for the preparation of a compound of the formula:



I

in which

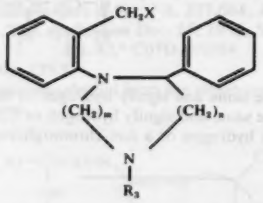
*n* is the number 1 or 2,

*m* is the number 1 if $n = 2$, and the number 2 if $n = 1$,

$R_1$ and $R_2$ are selected from the group consisting of hydrogen, hydroxy, halogen, alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, and trifluoromethyl,

$R_3$ is selected from the group consisting of hydrogen and alkyl having 1 to 6 carbon atoms,

which comprises ring-closing a compound of the formula:



III

or a salt thereof, in which *n*, *m*, $R_1$, $R_2$ and $R_3$ have the aforesaid meanings, and X is selected from the group consisting of hydroxy, chlorine, bromine, iodine and esterified hydroxy, in the presence of an acid or a Lewis acid and recovering the desired compound from the reaction mixture.

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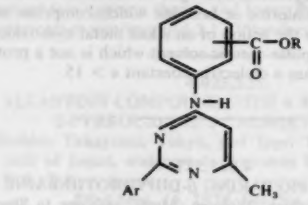
## 4,025,514
## ARYLAMINO PYRIMIDINIC DERIVATIVES

**Claude P. Fauran, Paris; Guy R. Bourgery, Colombes; Guy M. Raynaud, Paris, and Claude J. Gouret, Meudon, all of France, assignors to Delalande S.A., Courbevoie, France**

**Continuation-in-part of Ser. No. 502,285, Sept. 3, 1974, Pat. No. 3,978,055. This application Aug. 16, 1976, Ser. No. 714,472**
**Claims priority, application France, Sept. 20, 1973, 73.33831; Mar. 26, 1974, 74.10327**
**Int. Cl.[2] C07D** *239/42*
**U.S. Cl. 260—256.4 N** **3 Claims**

1. A compound having the formula



in which
Ar is m-fluorophenyl and R is ethyl, or
Ar is 3,4,5-trimethoxyphenyl and R is 2,2-dimethyl-1,3-dioxolan-4-yl methyl.

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**4,025,515**

## 6-CHLORO-2,4-DIAMINOPYRIMIDINES

**Rupert Schneider, Riehen, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland**

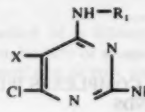
**Continuation of Ser. No. 435,222, Jan. 21, 1974, abandoned, which is a continuation-in-part of Ser. No. 174,568, Aug. 24, 1971, Pat. No. 3,892,554, which is a continuation-in-part of Ser. No. 10,056, Feb. 9, 1970, abandoned. This application Mar. 7, 1975, Ser. No. 556,304**

**Claims priority, application Switzerland, Feb. 14, 1969, 2234/69**

**Int. Cl.² C07D** *239/30*

**U.S. Cl. 260—256.4 N** **10 Claims**

1. A compound of the formula:



wherein
X is hydrogen or chloro, and
$R_1$ is isopropyl, isobutyl, sec. - butyl, tert. - butyl, n-pentyl, n-hexyl or cyclohexyl, with the proviso that $R_1$ is isopropyl when X is chloro,
or an agriculturally acceptable acid addition salt thereof.

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**4,025,516**

## PROCESS FOR THE PREPARATION OF (−)-6a,10a-TRANS-6a,7,8,10a-TETRAHYDRODIBENZO[B,D]-PYRANS

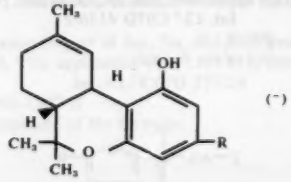
**Raj Kumar Razdan, Belmont, and Haldean Cloyce Dalzell, Weston, both of Mass., assignors to The John C. Sheehan Institute for Research, Inc., Cambridge, Mass.**

**Continuation-in-part of Ser. No. 589,742, June 24, 1975, abandoned. This application Nov. 28, 1975, Ser. No. 636,132**

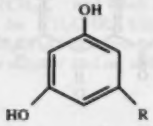
**Int. Cl.² C07D** *311/78*

**U.S. Cl. 260—345.3** **18 Claims**

1. A process for the preparation of a compound of the formula



wherein R is hydrogen or a straight or branched alkyl containing 1 to 10 carbon atoms, comprising reacting a compound of the formula



wherein R is as above,
with (+)-p-mentha-2,8-dien-1-ol in an inert organic solvent in a temperature range of −20° to +25° C in the presence of 0.04 to 0.40 mole per liter of an acid catalyst selected from the group consisting of boron trifluoride, boron trifluoride etherate, aluminum chloride, stannic chloride and antimony pentafluoride and an excess of a nonalkaline dehydrating agent selected from the group consisting of calcium sulfate, magnesium sulfate, sodium sulfate, calcium chloride, aluminum oxide, silica, and molecular sieves.

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**4,025,517**

## 4-OXO-2-HEXAHYDROPYRIMIDINYLIDENE UREAS

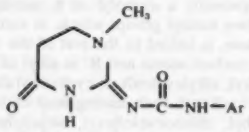
**Chris Royce Rasmussen, Ambler, Pa., assignor to McNeil Laboratories, Incorporated, Fort Washington, Pa.**

**Division of Ser. No. 589,494, June 23, 1975, Pat. No. 3,983,135, which is a continuation-in-part of Ser. No. 508,795, Sept. 23, 1974, abandoned, which is a continuation-in-part of Ser. No. 408,022, Oct. 19, 1973, abandoned. This application June 7, 1976, Ser. No. 693,449**

**Int. Cl.² C07D** *239/22*

**U.S. Cl. 260—256.4 C** **1 Claim**

1. A 4-oxo-2-hexahydropyrimidinylidene urea having the formula



wherein Ar is a member selected from the group consisting of phenyl, nitrophenyl, trifluoromethylphenyl, diloweralkylaminophenyl, and phenyl substituted with from one to three members each selected from the group consisting of halo, loweralkyl, and loweralkoxy.

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**4,025,518**

## PROCESS FOR PREPARING QUINACRIDONEQUINONE BY OXIDATION OF DIHYDROQUINACRIDONE

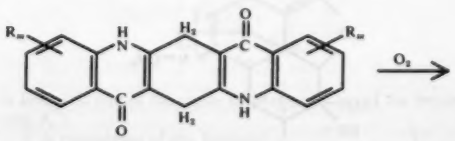
**Peter Artur Wriede, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Feb. 20, 1976, Ser. No. 659,932**

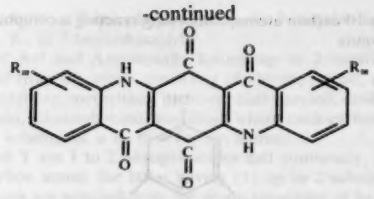
**Int. Cl.² C09B** *48/00*

**U.S. Cl. 260—279 QA** **7 Claims**

1. In a process for oxidizing a dihydroquinacridone to a quinacridonequinone according to the equation



-continued



where R is selected from the group consisting of hydrogen, halogen, and lower alkyl and *m* is an integer from 1 to 2, inclusive, by contacting said dihydroquinacridone with an oxidizing agent in an aqueous acidic medium at an elevated temperature,

the improvement comprising utilizing an alkali metal chlorate as the oxidizing agent in the presence of vanadium pentoxide.

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**4,025,519**

**BENZENESULFONYL-UREAS**

**Rudi Weyer, Frankfurt am Main; Walter Aumüller, Kelkheim, Taunus; Volker Hitzel, Lorsbach, Taunus, and Felix Helmut Schmidt, Mannheim, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

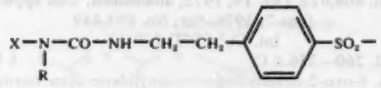
**Division of Ser. No. 385,323, Aug. 3, 1973, Pat. No. 3,919,245. This application Apr. 15, 1975, Ser. No. 568,268**

**Claims priority, application Germany, Aug. 7, 1972, 2238870**

**Int. Cl.² C07D *215/38***

**U.S. Cl. 260—283 SA** **6 Claims**

1. A benzenesulfonyl-urea of the formula



$$-NH-CO-NH-R^1 ,$$

in which X represents a quinolyl or a substituted quinolyl having one or two methyl groups which, in vicinal position to the nitrogen atom, is linked to the rest of the molecule, R is alkyl of 1 to 3 carbon atoms and $R^1$ is alkyl of 3 to 6 carbon atoms, cycloalkyl, alkylcycloalkyl, cycloalkylalkyl, cycloalkenyl or alkylcycloalkenyl each having to 9 carbon atoms, cyclohexenylmethyl, chlorocyclohexyl, bicycloheptenylmethyl, bicycloheptylmethyl, bicycloheptenyl, bicycloheptyl, nortricyclyl, adamantyl, benzyl, or a physiologically tolerable salt thereof.

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**4,025,520**

**DEHYDROHALOGENATION OF A 7-HALODIHYDROCODEINONE DIALKYL KETAL**

**Edward Leon Grew, and Nigel David Vaughan Wilson, both of Edinburgh, Scotland, assignors to Macfarlan Smith Limited, Edinburgh, Scotland**

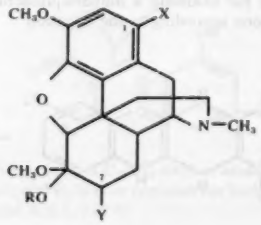
**Filed Mar. 28, 1975, Ser. No. 563,052**

**Claims priority, application United Kingdom, Apr. 10, 1974, 15971/74**

**Int. Cl.² C07D *489/00***

**U.S. Cl. 260—285** **13 Claims**

1. A process for the dehydrohalogenation of a 7-halo- or a 1,7-dihalodihydrocodeinone dialkyl ketal of the general formula (I):



(I)

in which R represents an alkyl group containing from 1 to 6 carbon atoms, X represents hydrogen or chlorine or bromine and Y represents chlorine or bromine which comprises subjecting the ketal to the action of an alkali metal hydroxide in the presence of a polar aprotic solvent which is not a proton donor and which has a dielectric constant $\epsilon > 15$.

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**4,025,521**

**METHOD OF PREPARING β-DIHYDROTHEBAINE**

**David Edward Portlock, Woburn, Mass., assignor to Sharps Associates, Cambridge, Mass.**

**Filed Oct. 22, 1975, Ser. No. 624,666**

**Int. Cl.² C07D *489/00***

**U.S. Cl. 260—285** **2 Claims**

1. A method of producing β-dihydrothebaine, which method comprises:

the step of reducing thebaine with from 1 to 3 equivalents of potassium in liquid ammonia without any catalyst.

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**4,025,522**

**CONVERSION OF LEUROSINE TO VINCATHICINE**

**Norbert Neuss, and Susan S. Tafur, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Division of Ser. No. 547,895, Feb. 7, 1975, Pat. No. 3,968,113. This application Jan. 14, 1976, Ser. No. 648,845**

**Int. Cl.² C07D *519/04***

**U.S. Cl. 260—287 B** **1 Claim**

1. 4-Desacetylvincathicine.

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**4,025,523**

**CYCLIC TETRA-OXYETHYLENE COMPLEXES WITH IONIC COMPOUNDS**

**Edwin C. Steiner, Midland, Mich.; Robert A. Newton, and F. Peter Boer, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.**

**Continuation of Ser. No. 460,866, April 15, 1974, abandoned. This application May 24, 1976, Ser. No. 689,003**

**Int. Cl.² C07D *403/02***

**U.S. Cl. 260—297 R** **2 Claims**

1. A composition of matter comprising a complex between:

a. a cyclic tetramer represented by the formula $\{(CH_2CH_2O)_4\}$ and

b. a salt of a pyridinium cation.

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**4,025,524**

**2-{3-[4-AZATRICYCLO(4.3.1.1$^{3,8}$)UNDECAN-4-YL]-1,1-DIPHENYLPROPYL}-5-METHYL-1,3,4-OXADIAZOLE AND CONGENERS**

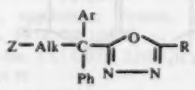
**Gilbert W. Adelstein, Evanston, and H. William Sause, Deerfield, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.**

**Continuation-in-part of Ser. No. 568,405, April 16, 1975, abandoned. This application Jan. 26, 1976, Ser. No. 652,361**

**Int. Cl.² C07D *413/02***

**U.S. Cl. 260—296 R** **5 Claims**

1. A compound of the formula



wherein R represents hydrogen or lower alkyl, Ar represents phenyl or pyridyl, Ph represents phenyl, Alk represents alkylene containing more than 1 and fewer than 4carbons, and Z represents 4-azatricyclo[4.3.1.1$^{3,8}$]undecan-4-yl.

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4,025,525

## ALLANTOIN COMPOUND WITH A METAL SALT OF 2-PYRROLIDONE-5-CARBOXYLIC ACID

Hirohide Takayama, Tokyo, and Ippei Yoshimura, Mitaka, both of Japan, assignors to Kawaken Fine Chemicals Co., Ltd., Tokyo, Japan

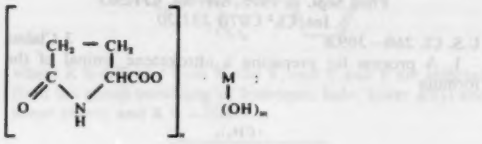
Filed Sept. 16, 1975, Ser. No. 613,913

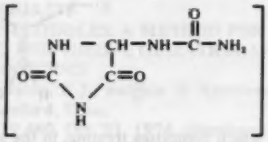
Claims priority, application Japan, Sept. 25, 1974, 49-109509

Int. Cl.[2] C07D *403/02*; C07F *5/06*

U.S. Cl. 260—299 5 Claims

1. A compound of the formula





in which M is lithium, sodium, potassium, calcium, magnesium, barium or aluminum; n is an integer of one to three; m is zero, one or two; and $(m+n)$ is the valence of M.

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4,025,526

## PROCESS FOR PRODUCING THIAZOLES

Fumio Suzuki; Mitsuo Tanaka, and Yoshiaki Mera, all of Funabashi, Japan, assignors to Nissan Chemical Industries, Ltd., Tokyo, Japan

Filed Oct. 2, 1975, Ser. No. 618,844

Claims priority, application Japan, Oct. 3, 1974, 49-114239; Oct. 16, 1974, 49-118884

Int. Cl.[2] C07D *277/22*

U.S. Cl. 260—302 R 8 Claims

1. A process for producing thiazoles which comprises forming a carbon layer on the walls of a reactor by reacting a hydrocarbon with sulfur or oxygen, or by thermally decomposing trialkylboron; and subsequently reacting diethylamine or ethylidene-ethylamine with sulfur to produce 2-methylthiazole or reacting diisopropylamine with sulfur to produce 2,4-dimethylthiazole.

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4,025,527

## CERTAIN THIAZOLES AND OXAZOLES

Graham John Durant, and Charon Robin Ganellin, both of Welwyn Garden City, England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

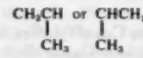
Continuation-in-part of Ser. No. 481,716, June 21, 1974, abandoned. This application Dec. 15, 1975, Ser. No. 640,525

Int. Cl.[2] C07D *277/28*

U.S. Cl. 260—302 H 11 Claims

1. A compound of the formula:

wherein $Het_1$ and $Het_2$, which may be the same or different, are thiazole or oxazole, which is optionally monosubstituted by lower alkyl having 1 to 4 carbon atoms, hydroxyl, halogen or amino; $Z_1$ and $Z_2$ are sulphur or a methylene group; $B_1$ is $(CH_2)_{n_1}$ and $B_2$ is $(CH_2)_{n_2}$ and when $Z_1$ is sulphur and $m_1$ is 1, $B_1$ may also be $CH_2CHR$, $CHRCH_2$, $CHRCH_2CH_2$, $CH_2CHRCH_2$ or $CH_2CH_2CHR$ wherein R is methyl or ethyl or when $Z_1$ and $Z_2$ are sulphur and $m_1$ and $m_2$ are 1, both $B_1$ and $B_2$ may also be



$m_1$ and $m_2$ are 0, 1 or 2 and $n_1$ and $n_2$ are 2 or 3, provided that the sum of $m_1$ and $n_1$ and the sum of $m_2$ and $n_2$ are from 2 to 4; and X is sulphur, oxygen or NY wherein Y is hydrogen, cyano, $CONH_2$ or $SO_2R_1$ wherein $R_1$ is lower alkyl or phenyl, provided that when X is NH, at least one of $Z_1$ or $Z_2$ is sulphur or a pharmaceutically acceptable acid addition salt thereof.

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4,025,528

## THIAZOLE DERIVATIVES OF BENZOIC AND PHENYLALKANOIC ACIDS

Ryozo Maeda, Osaka, and Katsumi Hirose, Kishiwada, both of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

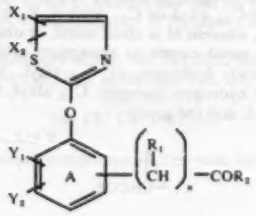
Continuation-in-part of Ser. No. 516,867, Oct. 21, 1974, abandoned. This application July 16, 1975, Ser. No. 596,244

Claims priority, application Japan, Oct. 24, 1973, 48-119583; Oct. 29, 1973, 48-121534

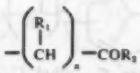
Int. Cl.[2] C07D *277/54*, *277/36*, *277/34*

U.S. Cl. 260—306.8 R 29 Claims

1. A compound of the formula:

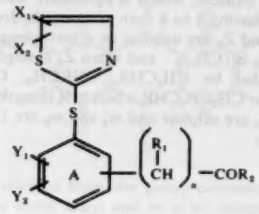


wherein $R_1$ is hydrogen, $C_{1-5}$ alkyl, $C_{2-5}$ alkenyl, $C_{2-5}$ alkynyl, $C_{3-6}$ cycloalkyl-$C_{1-3}$ alkyl or $C_{7-8}$ aralkyl; $R_2$ is hydroxy, $C_{1-5}$ alkoxy or OM, wherein M is alkali metal, or one equivalent of alkaline earth metal, cupric or aluminium cation; n is an integer of 0 or 1; $X_1$ and $X_2$ are independently hydrogen or $C_{1-5}$ alkyl; $Y_1$ and $Y_2$ are independently hydrogen, halogen, $C_{1-5}$ alkyl, $C_{1-5}$ alkoxy or trifluoromethyl, and the group

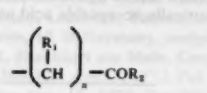


is linked to one of the meta- or para-positions of the benzene ring A.

2. A compound of the formula:

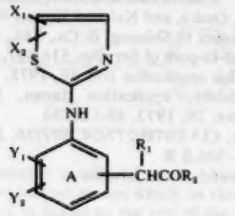


wherein $R_1$ is hydrogen, $C_{1-5}$ alkyl, $C_{2-5}$ alkenyl, $C_{3-5}$ alkynyl, $C_{3-6}$ cycloalkyl-$C_{1-3}$ alkyl or $C_{7-9}$ aralkyl; $R_2$ is hydroxy, $C_{1-5}$ alkoxy or OM, wherein M is alkali metal, or one equivalent of alkaline earth metal, cupric or aluminium cation, n is an integer of 0 or 1; $X_1$ and $X_2$ are independently hydrogen or $C_{1-5}$ alkyl; $Y_1$ and $Y_2$ are independently hydrogen, halogen, $C_{1-5}$ alkyl, $C_{1-5}$ alkoxy or trifluoromethyl, and the group

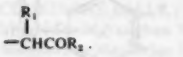


is linked to one of the meta- or para-positions of the benzene ring A.

3. A compound of the formula:

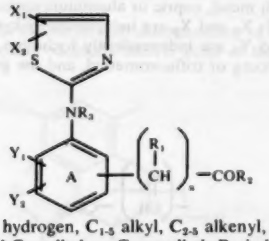


wherein $R_1$ is hydrogen, $C_{1-5}$ alkyl, $C_{2-5}$ alkenyl, $C_{3-5}$ alkynyl, $C_{3-6}$ cycloalkyl-$C_{1-3}$ alkyl or $C_{7-9}$ aralkyl; $R_2$ is hydroxy, $C_{1-5}$ alkoxy or OM, wherein M is alkali metal, or one equivalent of alkaline earth metal, cupric or aluminium cation; $X_1$ and $X_2$ are independently hydrogen, or $C_{1-5}$ alkyl; $Y_1$ and $Y_2$ are independently hydrogen, halogen, $C_{1-5}$ alkyl, $C_{1-5}$ alkoxy or trifluoromethyl, and the group



is linked to one of the meta- or para-positions of the benzene ring A.

4. A compound of the formula



wherein $R_1$ is hydrogen, $C_{1-5}$ alkyl, $C_{2-5}$ alkenyl, $C_{3-5}$ alkynyl, $C_{3-6}$ cycloalkyl-$C_{1-3}$ alkyl or $C_{7-9}$ aralkyl; $R_2$ is hydroxy, $C_{1-5}$ alkoxy or OM, wherein M is alkali metal, or one equivalent of alkaline earth metal, cupric or aluminum cation; $R_3$ is $C_{1-5}$ alkyl, $C_{2-5}$ alkenyl, $C_{3-5}$ alkynyl, $C_{3-6}$ cycloalkyl-$C_{1-3}$ alkyl or $C_{7-9}$ aralkyl; $n$ is an integer of 0 or 1; $X_1$ and $X_2$ are independently hydrogen or $C_{1-5}$ alkyl; $Y_1$ and $Y_2$ are independently hydrogen, halogen, $C_{1-5}$ alkyl, $C_{1-5}$ alkoxy or trifluoromethyl, and the group



is linked to one of the meta- or para-positions of the benzene ring A.

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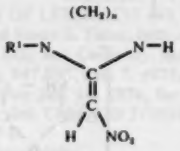
**4,025,529**

## PREPARATION OF NITROKETENE AMINALS

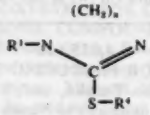
**Willy D. Kollmeyer, Modesto, Calif., assignor to Shell Oil Company, Houston, Tex.**

**Filed Sept. 8, 1975, Ser. No. 611,363**
**Int. Cl.² C07D 233/20**
**U.S. Cl. 260—309.6** **3 Claims**

1. A process for preparing a nitroketene aminal of the formula



which comprises treating, in the substantial absence of water and oxygen, an isothiourea with nitromethane, said isothiourea being one defined by the formula:



wherein $R^1$ contains up to six carbon atoms and is alkyl, mono- or polyhaloalkyl, alkenyl, mono- or polyhalo-alkenyl, alkoxyalkyl, alkylthioalkyl, cyanoalkyl or alkynyl, $n$ is 2 or 3, and $R^4$ is alkyl of 1 to 4 carbon atoms or is benzyl.

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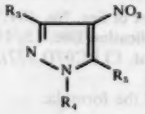
**4,025,530**

## 4-NITROPYRAZOLES

**Aldo Joseph Crovetti, Lake Forest; Donald Sykes Kenney, Northbrook; Don Murl Lynch, Waukegan, all of Ill., and Robert George Stein, Kenosha, Wis., assignors to Abbott Laboratories, North Chicago, Ill.**

**Division of Ser. No. 466,424, May 2, 1974, Pat. No. 3,932,453, which is a division of Ser. No. 282,889, Aug. 21, 1972, Pat. No. 3,869,274. This application Nov. 17, 1975, Ser. No. 632,437**
**Int. Cl.² C07D 231/16**
**U.S. Cl. 260—310 R** **11 Claims**

1. A 4-nitropyrazole having a formula of



wherein $R_3$ is selected from the group consisting of methyl, n-$C_3H_7$, i-$C_3H_7$, and cyclohexyl; $R_4$ is selected from the group consisting of hydrogen, methanesulfonyl, $C_2$-$C_{20}$ alkylsulfonyl,

p-toluenesulfonyl, trichloromethylmercapto, carbomethoxy and phenoxyacetyl and $R_4$ is selected from the group consisting of halo and $CF_3$.

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**4,025,531**

**α-TRICHLOROMETHYL THENYL ANILINES AS BIODIGRADABLE INSECTICIDES AND MOLLUSCIDES**

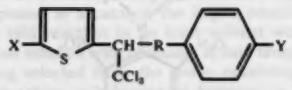
**Robert George Stein, Kenosha, Wis.; Terry Lee Couch, Waukegan, and Aldo Joseph Crovetti, Lake Forest, both of Ill., assignors to Abbott Laboratories, North Chicago, Ill.**

**Filed Apr. 7, 1975, Ser. No. 565,996**

**Int. Cl.² C07D *333/12***

**U.S. Cl. 260—332.5** **3 Claims**

1. A chemical compound of the formula



where R is different from X and Y, and X and Y are selected from the group consisting of hydrogen, halo, lower alkyl and lower alkoxy and R is —NH—.

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**4,025,532**

**2-(O-TOLYL)IMINO-1,3-DITHIOLES, A METHOD FOR PREPARING THE SAME, AND THEIR UTILIZATION AS IXODICIDES**

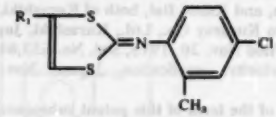
**Thomas Andrew Lies, Princeton, N.J., assignor to American Cyanamid Company, Stamford, Conn.**

**Continuation of Ser. No. 519,460, Oct. 31, 1974, abandoned. This application Feb. 17, 1976, Ser. No. 658,154**

**Int. Cl.² C07D *339/06***

**U.S. Cl. 260—327 M** **3 Claims**

1. A compound of the formula:



wherein $R_1$ is a member selected from a group consisting of hydrogen and methyl.

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**4,025,533**

**5-BROMO-5-NITRO-2-ALKYLSUBSTITUTED-1,3-DIOXANE**

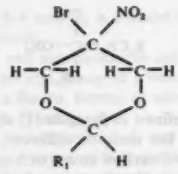
**Lewis C. Lappas, and Clarence A. Hirsch, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Continuation of Ser. No. 514,166, Oct. 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 427,945, Dec. 26, 1973, abandoned, which is a continuation-in-part of Ser. No. 333,418, Feb. 16, 1973, abandoned. This application Apr. 14, 1976, Ser. No. 676,944**

**Int. Cl.² C07D *319/06*; A01N *9/28***

**U.S. Cl. 260—340.7** **5 Claims**

1. A compound of the formula



wherein

$R_1$ is methyl, ethyl, n-propyl, or isopropyl;

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**4,025,534**

**CONTINUOUS PROCESS FOR PRODUCING GAMMA-BUTYROLACTONE BY CATALYTIC HYDROGENATION OF MALEIC ANHYDRIDE**

**Lothar Sandhack, Rheurdt; Werner Webers, Orsoy; Georg Michalczyk, Neukirchen-Vluyn, and Karl-Heinz Gluzek, Alpen, all of Germany, assignors to Deutsche Texaco Aktiengesellschaft, Hamburg, Germany**

**Filed Jan. 12, 1976, Ser. No. 648,332**

**Claims priority, application Germany, Jan. 15, 1975, 2501310**

**Int. Cl.² C07D *307/32***

**U.S. Cl. 260—343.6** **12 Claims**

1. A continuous process for producing gamma-butyrolactone by catalytically hydrogenating maleic anhydride which comprises subjecting said anhydride in the liquid phase to a plural stage hydrogenation operation at a pressure of about 100 to 125 atmospheres and at a liquid hourly space volocity of about 2.0 to 5.0 moles of maleic anhydride per liter of catalyst per hour, wherein the catalyst employed in each stage of said plural stage hydrogenation is cobalt oxide and palladium on silica, wherein said catalyst comprises from about 20 to 30 weight percent cobalt oxide, 0.1 to 1.5 weight percent palladium and the balance silica, where the first stage of said hydrogenation is conducted at a temperature of about 50° to 100° C. and where the final stage of said hydrogenation is conducted at a temperature of about 190° to 220° C.

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**4,025,535**

**SULFOALKYLATED FLAVANONE SWEETENERS**

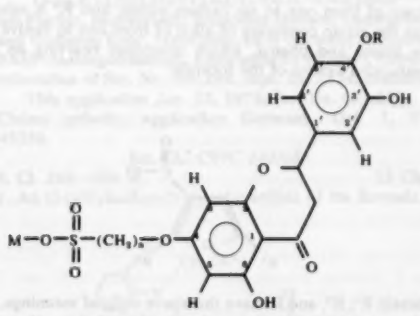
**Guy A. Crosby; Grant E. DuBois, and Ned M. Weinshenker, all of Palo Alto, Calif., assignors to Dynapol Corporation, Palo Alto, Calif.**

**Continuation-in-part of Ser. No. 561,522, March 24, 1975, Pat. No. 3,974,299. This application Feb. 13, 1976, Ser. No. 657,905**

**Int. Cl.² C07D *311/02***

**U.S. Cl. 260—345.2** **16 Claims**

1. A flavanone compound represented by the structural formula



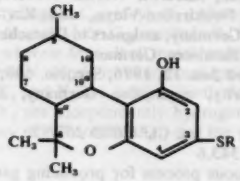
wherein R is a lower alkyl of from one to three carbon atoms inclusive, *n* is an integer of from one to three inclusive and M is hydrogen or a physiologically acceptable metal cation.

## 4,025,536
## TRI-CYCLIC COMPOUNDS DERIVED FROM THIAPHLOROGLUCINOL ETHERS

Friedrich-Wilhelm A. G. K. Korte, Attenkirchen, Germany, and Frederick Coulston, Rensselaer, N.Y., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Sept. 5, 1975, Ser. No. 610,602
Int. Cl.² C07D *307/83*
U.S. Cl. 260—345.3 9 Claims

1. A compound of the formula



wherein R is an alkyl group of 3 to 10 carbon atoms and the dotted line indicates a double bond connected to the 9-position.

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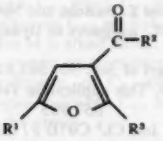
## 4,025,537
## PREPARATION OF 3-CARBOALKOXY OR 3-ALKANOYL FURANS

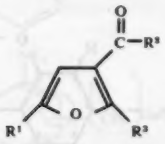
Richard Allan Kretchmer, 270 Walker Ave., Clarendon Hills, Ill. 60514, and Robert Anton Laitar, 3401 S. Parnell, Chicago, Ill. 60616

Filed June 9, 1975, Ser. No. 584,712
Int. Cl.² C07D *307/68*
U.S. Cl. 260—347.5 7 Claims

1. A process for the preparation of a furan of the formula



wherein $R^1$ is selected from the group consisting of hydrogen, alkyl of from one to twelve carbon atoms, and alkenyl of from two to twelve carbon atoms; $R^2$ is selected from the group consisting of alkyl of from one to twelve carbon atoms and alkoxy of from one to six carbon atoms; and $R^3$ is selected from the group consisting of alkyl of from one to twelve carbon atoms and phenyl, which comprises reacting an $\alpha,\beta$-unsaturated ketone of the formula:



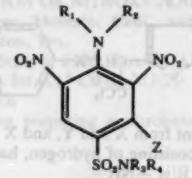
wherein $R^1$, $R^2$, and $R^3$ have the above defined meanings, with N-bromosuccinimide in a solvent selected from the group consisting of carbon tetrachloride, benzene, hexane, heptane, chloroform and ether and cyclizing the resulting bromine containing intermediate at a temperature above about 60° C.

## 4,025,538
## 2,6-DINITROANILINE HERBICIDES

Albert William Lutz, Montgomery Township, Somerset County, and Robert Eugene Diehl, Trenton, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 323,000, Jan. 12, 1973, Pat. No. 3,920,742, which is a continuation-in-part of Ser. No. 262,807, June 14, 1972, abandoned, which is a continuation-in-part of Ser. No. 174,938, Aug. 25, 1971, abandoned. This application July 25, 1975, Ser. No. 599,224
Int. Cl.² C07C *147/00*
U.S. Cl. 260—397.6 10 Claims

1. A compound of the formula:



wherein
Z is methyl;
$R_1$ is hydrogen, alkyl $C_1$–$C_6$, alkenyl $C_2$–$C_6$ or alkynyl $C_2$–$C_6$;
$R_2$ is alkyl $C_2$–$C_7$ and may be straight, branched or cyclo; and
$R_3$ and $R_4$ each is hydrogen or alkyl $C_1$–$C_4$.

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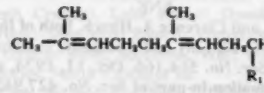
## 4,025,539
## PROCESS FOR PREPARING 2-SUBSTITUTED OR UNSUBSTITUTED GERANYL ACETIC ACIDS AND ESTERS THEREOF

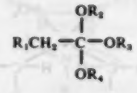
Yoshiji Fujita, Kurashiki; Yoshiaki Omura, Okayama; Takashi Nishida, and Kazuo Itoi, both of Kurashiki, all of Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Filed Nov. 20, 1975, Ser. No. 633,612
Claims priority, application Japan, Nov. 21, 1974, 49-134801
The portion of the term of this patent subsequent to Dec. 23, 1992, has been disclaimed.
Int. Cl.² C09F *5/00*, *3/02*
U.S. Cl. 260—404 10 Claims

1. A process for preparing geranyl acetic acid esters of the formula [I]:



wherein $R_1$ represents a hydrogen atom or a hydrocarbon group of 1 to 20 carbon atoms, and $R_5$ is the same as $R_2$, $R_3$ or $R_4$ below in formula [III], said process comprises reacting linalool with a 2-substituted orthoacetic acid ester derivative of the formula [III]:



wherein $R_1$ is as defined in formula [I] above and $R_2$, $R_3$ and $R_4$, which may be the same or different, each represents an alkyl group of 1 to 8 carbon atoms or a cycloalkyl group of 3 to 8 carbon atoms; in the presence of an acidic catalyst

## 4,025,540
## PROCESS FOR THE PRODUCTION OF PURE CARBOXYLIC ACID-1-MONOGLYCERIDES

Axel Kleemann; Heinz Kolb, both of Hanau; Anne Rindfuss, Frankfurt; Gerd Schreyer, Hanau; Ludwig-Karl Schwörzer, Illertissen, and Gregor Schuster, Neu-Ulm, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Filed Oct. 16, 1975, Ser. No. 623,076

Claims priority, application Germany, Oct. 19, 1974, 2449847

Int. Cl.² C09F *5/08;* C11C *3/00, 3/02*

U.S. Cl. 260—410.7 18 Claims

1. In a process for the product of a very pure carboxylic acid-1-monoglyceride comprising reacting a carboxylic acid having 7 to 20 carbon atoms with glycidol at 80° to 200° C. in the presence of a basic reacting alkali metal or alkaline earth metal compound as a catalyst the improvement comprising conducting said reaction in an inert solvent which forms a homogeneous solution with reactants at said temperature said solvent being selected from the group consisting of an aromatic hydrocarbon, a halogenated benzene, a halogenated toluene, an aliphatic ketone having 3 to 9 carbon atoms and an aliphatic ether having at least 6 carbon atoms.

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## 4,025,541
## CHARGE TRANSFER COMPLEXES OF FERROCENES HAVING LIGHT FILTERING PROPERTIES

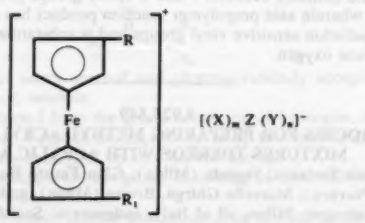
Michael F. Froix, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 445,388, Feb. 25, 1974, Pat. No. 3,975,289. This application Nov. 18, 1975, Ser. No. 632,925

Int. Cl.² C07F *17/02*

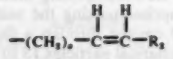
U.S. Cl. 260—439 CY 5 Claims

1. A complex represented by the formula:




wherein

R is defined as an alkyl group, an aryl group, an acyl group, a halo group, a halomercuri group, a hydroxy lower alkyl group, or a vinyl group of the formula:




wherein

*o* is defined as 0–4 and $R_2$ is defined as a halo group or a lower alkyl group;

$R_1$ is separately and independently defined as H or a R;

Z is defined as an aryl group or a benzoquinonyl group;

X is defined as a fluoro, bromo or nitro group;

Y is defined as a cyano group;

*m* is defined as an integer of 0–4; and

*n* is defined as an integer of 0–4, the sum of *m* and *n* being not less than 2 or greater than 4.

## 4,025,542
## NOVEL ETHERS, THEIR PREPARATION AND USE AS OXYDIMETHYLATING AGENTS

Cataldo Aldino Maggiulli; Donald MacArthur Burness, and William Clarence Perkins, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed July 21, 1975, Ser. No. 597,950

Int. Cl.² C07C *143/68*

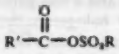
U.S. Cl. 260—456 R 5 Claims

1. A compound having the formula:

$$R - SO_2O - CH_2 - O - CH_2 - OSO_2 - R$$

wherein R is alkyl having from 1 to 6 carbon atoms.

3. A method of preparing a compound of claim 1 which comprises reacting a compound having the formula




wherein R′ and R are independently alkyl having from 1 to 6 carbon atoms with an ether selected from the group consisting of trioxane, tetraoxane and linear polyoxymethylenes having the formla

$$CH_3CO_2(CH_2O)_nCOCH_3$$

wherein *n* is an integer from 3 to 6 at a temperature range from about 0° to about 120° C in a substantially moisture-free environment.

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## 4,025,543
## PROCESS FOR THE PREPARATION OF 1,4-NAPHTHODINITRILE

Lorenz Heiss, Hofheim, Taunus, and Klaus Uhl, Neuenhain, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Jan. 23, 1976, Ser. No. 651,699

Claims priority, application Germany, Jan. 28, 1975, 2503321

Int. Cl.² C07C *121/62*

U.S. Cl. 260—465 H 3 Claims

1. Process for the preparation of 1,4-naphthodinitrile, which comprises heating at a temperature of from 30° to 160° C o-phenylene-diacetonitrile with a compound of the formula

$$R-N=CH-CH=N-R$$

wherein R is alkyl with 1 to 4 carbon atoms, cyclohexyl or phenyl which is substituted by 1 to 3 of the substitutents chlorine, methyl or nitro.

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## 4,025,544
## O-ALKYLSULFONYLGLYCOLIC ANILIDES

Adolf Fischer, Mutterstadt; Hanspeter Hansen, Ludwigshafen, and Wolfgang Rohr, Mannheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

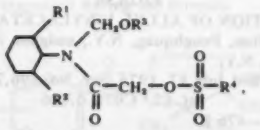
Continuation of Ser. No. 506,294, Sept. 16, 1974, abandoned. This application Jan. 22, 1976, Ser. No. 651,230

Claims priority, application Germany, Oct. 1, 1973, 2349256

Int. Cl.² C07C *143/68*

U.S. Cl. 260—456 A 15 Claims

1. An O-(alkylsulfonyl)-glycolic anilide of the formula



where $R^1$ and $R^2$ denote alkyl of 1 to 4 carbon atoms, $R^3$ denotes alkyl of 1 to 6 carbon atoms or allyl and $R^4$ denotes methyl, chloromethyl, ethyl, 2-chlorethyl, propyl, isopropyl, butyl, isobutyl, sec-butyl, tert-butyl, pentyl, cyclopentyl, hexyl, cyclohexyl, benzyl, vinyl, allyl, butenyl or hexenyl.

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4,025,545

## HYDROGEN HALIDE REMOVAL IN HALOGENATED ALIPHATIC NITRILE PRODUCTION

**Sudhir K. Mendiratta; Ronald L. Dotson, and George M. Shipley, all of Cleveland, Tenn., assignors to Olin Corporation, New Haven, Conn.**

**Filed Feb. 25, 1976, Ser. No. 661,404**
**Int. Cl.² C07C *121/14***
**U.S. Cl. 260—465.7** **8 Claims**

1. A method for removing hydrogen halide from a mixture of said hydrogen halide and a halogenated saturated aliphatic nitrile, said halide and halogen substituents being selected from the group consisting of chlorine, bromine, or both, and said hydrogen halide and said nitrile having a relationship such that below a first predetermined temperature said nitrile and at least a portion of said hydrogen halide are associated in combined form in said mixture and such that at or above a second predetermined temperature above said first temperature said association is substantially destroyed, which comprises:

1. Heating said mixture at a temperature equal or greater than said second predetermined temperature to provide a vapor comprising said hydrogen halide and at least a portion of said halogenated aliphatic nitrile in substantially unassociated form.
2. Condensing said vapor at a condensation temperature above said first temperature but below the boiling point of said nitrile, recovering said nitrile as a condensate having levels of said hydrogen halide.

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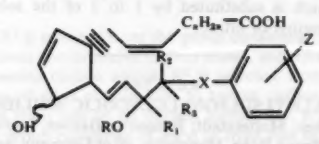
4,025,546

## PROSTAGLANDIN ANALOGUES

**Evert De Jager, Oss, Netherlands, and William Robert Pilgrim, Witry-les Reims, France, assignors to Akzo N.V., Arnhem, Netherlands**

**Filed Nov. 6, 1975, Ser. No. 629,435**
**Claims priority, application Netherlands, Nov. 11, 1974, 7414650**
**Int. Cl.² C07C *69/76***
**U.S. Cl. 260—473 A** **3 Claims**

1. A prostaglandin analogue of the general formula:




or a racemate thereof, and pharmaceutically acceptable salts, esters, amides and acyl derivatives thereof, in which $C_nH_{2n}$ represents alkylene (2–5 C),

R, $R_1$, $R_2$, $R_3$ represent hydrogen or alkyl (1–4 C),

X represents oxygen or sulphur,

Z represents F, Cl, Br or $CF_3$, and

the symbol indicates the $\alpha$-or $\beta$-configuration.

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4,025,547

## PREPARATION OF ALLYL VINYLACETATE ESTERS

**John F. Knifton, Poughquag, N.Y., assignor to Texaco Inc., New York, N.Y.**

**Filed July 17, 1975, Ser. No. 596,710**
**Int. Cl.² C07C *67/36***
**U.S. Cl. 260—476 R** **8 Claims**

1. A process for converting allylic alcohol substrates containing 3 to 30 carbon atoms, said alcohol substrates being selected from the group consisting of:

allyl alcohol, 2-methylallyl alcohol, crotyl alcohol, 2-pentenyl alcohol, 2-metyl-2-butenyl alcohol, 2-hexenyl alcohol, 3-methyl-2-pentenyl alcohol, 4-propyl-2-pentenyl alcohol, cinnamyl alcohol, geraniol, nerol, farnesol and phytol to linear allyl vinyl vinylacetate esters in good yields by a process of:

a. Admixing each mole of allylic alcohol to be carbonylated to said allyl vinylacetate ester with at least a catalytic amount of a ligand-stabilized palladium(II) halide-Group IVB metal halide catalyst selected from the group consisting of:
$PdCl_2[P(C_6H_5)_3]_2$-$SnCl_2$, $PdCl_2[P(C_6H_5)_3]_2$-$GeCl_2$, $PdCl_2[P(p\text{-}CH_3\text{-}C_6H_4)_3]_2$-$SnCl_2$, $PdCl_2[P(p\text{-}Cl\text{-}C_6H_4)_3]_2$-$SnCl_2$, $PdCl_2[P(p\text{-}CH_3\text{-}C_6H_4)_3]_2$-$SnCl_2$, $PdCl_2[P(CH_3)_2C_6H_5]_2$-$SnCl_2$, $PdCl_2[P(C_6H_5)_3]_2$-$SnCl_4$, and $PdCl_2[As(C_6H_5)_3]_2$-$SnCl_2$;
b. Pressurizing said reaction mixture with sufficient carbon monoxide to satisfy the stoichiometry of the carbonylation reaction;
c. Heating said pressurized reaction mixture to between 20° and 120° C until conversion of the allylic alcohol substrate to said allyl vinylacetate ester takes place, and
d. Isolating said allyl vinylacetate contained therein.

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4,025,548

## RADIATION CURABLE OLIGOMERS

**Thomas F. Huemmer, and Bruce A. Edison, both of South Bend, Ind., assignors to The O'Brien Corporation, South Bend, Ind.**

**Filed Feb. 4, 1974, Ser. No. 439,329**
**Int. Cl.² C07C *69/54***
**U.S. Cl. 260—486 B** **15 Claims**

1. A radiation-curable oligomer which comprises a prepolymer reaction product produced when an epoxy compound is cationically initiated in the presence of at least a stoichiometric equivalent amount of a vinyl mono-hydroxy terminator compound, wherein said epoxy compound has a molecular weight between 70 and 2000 and wherein said epoxy compound contains between 1 and 6 epoxy groups per molecule and wherein said prepolymer reaction product has a plurality of radiation sensitive vinyl groups and is substantially free of oxirane oxygen.

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4,025,549

## PROCESS FOR PREPARING METHYL ACRYLATE OR MIXTURES THEREOF WITH ACRYLIC ACID

**Natale Ferlazzo, Segrate (Milan); Gian Fausto Buzzi, Arona (Novara); Marcello Ghirga, Bresso (Milan), and Benedetto Calcagno, Milan, all of Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy**

**Filed Nov. 5, 1974, Ser. No. 521,101**
**Claims priority, application Italy, Nov. 28, 1973, 31747/73**
**Int. Cl.² C07C *69/54***
**U.S. Cl. 260—486 R** **30 Claims**

1. A method for preparing methyl acrylate or a mixture of methyl acrylate and acrylic acid by contacting with a catalyst a reacting gaseous flow comprising methanol, acrolein and oxygen, which comprises passing the said gaseous flow at a velocity of 5 to 50 cm/sec through a fluidized catalyst bed formed of regular spherical particles 15 to 100 microns in size, said particles comprising 10 to 80 Wt.% of a silica support, the remainder consisting of an active catalystic component chosen in the group of components defined by the general formulae:

$Mo_a\ V_b\ Me_c\ O_x$
$Mo_a\ W_d\ Me_c\ O_x$
$Mo_a\ V_b\ W_d\ Me_c\ O_x$

wherein Me is an element chosen in the group consisting of chromium, manganese, iron, cobalt, nickel, copper, zinc,

silver, cadmium, gold, mercury, sodium, barium, calcium, cerium, bismuth, thorium, uranium, lead, antimony, tin, phosphorus aand boron; and wherein *a*, *b*, *c*, *d*, *x*, *y*, *z* are numbers varying respectively: *a* from 6 to 12, *b* from 1 to 6, *c* from 0 to 5, *d* from 1 to 6, *x* from 20.5 to 58.5, *y* from 21 to 61.5 and *z* from 23.5 to 76.5, said catalyst having been obtained by forming an ammoniacal aqueous solution of soluble silicate and of compounds of the elements other than oxygen present in the said active component, at a concentration of the said compounds up to 10–12 wt.% in the solution, spray-drying said solution with a gas at a temperature from 350° to 450° C and maintaining the resulting particulate solid product in an air stream during 0.1 to 4 hours at a temperature from 150° to 350° C and subsequently in an inert gas stream during 0.5 to 14 hours at a temperature from 350° to 480° C.

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**4,025,550**

## DERIVATIVES OF TRIIODO-AMINOBENZENECARBOXYLIC ACIDS AND THE PREPARATION THEREOF

**Werner Obendorf; Irmgard Lindner; Ernst Schwarzinger, and Josef Krieger, all of Linz (Danube), Austria, assignors to Chemie Linz Aktiengesellschaft, Linz (Danube), Austria**

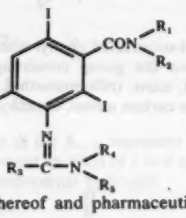
**Division of Ser. No. 381,337, July 20, 1973, Pat. No. 3,890,318. This application Mar. 28, 1975, Ser. No. 562,933**

**Claims priority, application Germany, July 21, 1972, 2235935**

**Int. Cl.² C07C *63/04***

**U.S. Cl. 260—518 A** **5 Claims**

1. A compound selected from the group consisting of compounds of the formula



lower alkyl esters thereof and pharmaceutically acceptable salts thereof, wherein

$R_1$ is selected from the group consisting of hydrogen, alkyl of up to 4 carbon atoms, alkenyl of up to 4 carbon atoms and alkoxyalkyl of up to 6 carbon atoms,

$R_2$ is selected from the group consisting of lower alkyl and lower alkenyl,

$R_3$ is alkylenecarboxylic acid group of up to 4 carbon atoms,

$R_4$ is selected from the group consisting of hydrogen and lower alkyl, and

$R_5$ is selected from the group consisting of alkyl of up to 4 carbon atoms, alkenyl of up to 4 carbon atoms and alkoxyalkyl of up to 6 carbon atoms.

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**4,025,551**

## 3-AMINO-N-SUBSTITUTED SUCCINAMIC ACIDS

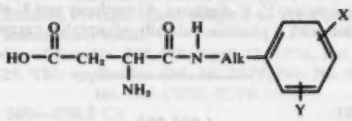
**Arthur H. Goldkamp, Bellevue, Wash.; Robert H. Mazur, Deerfield, and James M. Schlatter, Glenview, all of Ill., assignors to G. D. Searle & Co., Chicago, Ill.**

**Continuation-in-part of Ser. No. 442,431, Feb. 14, 1974, which is a continuation-in-part of Ser. No. 56,753, July 20, 1970, Pat. No. 3,803,233, which is a continuation-in-part of Ser. No. 704,229, Feb. 9, 1968, abandoned. This application Dec. 22, 1975, Ser. No. 642,890**

**Int. Cl.² C07C *101/72, 101/10, 101/16, 101/02***

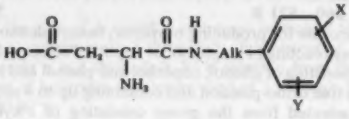
**U.S. Cl. 260—518 R** **13 Claims**

1. A compound of the formula



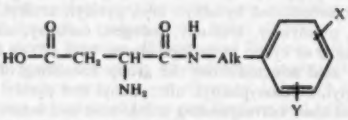
wherein Alk is an alkylene radical containing 2 carbon atoms; X is selected from the group consisting of halogen, hydroxy and methoxy; and Y is selected from the group consisting of hydrogen, halogen and methoxy.

5. A compound of the formula



wherein Alk is an alkylene radical containing 3 carbon atoms, and X and Y are selected from the group consisting of hydrogen, halogen, hydroxy and methoxy.

10. A compound of the formula



wherein Alk is an alkylene radical containing 4 carbon atoms, and X and Y are selected from the group consisting of hydrogen, halogen, hydroxy and methoxy.

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**4,025,552**

## 3-(4′-ALKOXY-BENZOYL)-1,2,2-TRIMETHYLCYCLOPENTANE-CARBOXYLIC ACIDS, METHODS OF USE AND COMPOSITIONS CONTAINING SUCH COMPOUNDS

**Henri Ange Orzalesi, Montpellier, France, assignor to Societe Civile de Recherches et d'Etudes Nouvelles (S.C.R.E.E.N.), Paris, France**

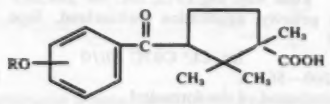
**Filed Jan. 13, 1975, Ser. No. 540,504**

**Claims priority, application France, Jan. 17, 1974, 74.01614**

**Int. Cl.² C07C *61/36, 65/20;* A61K *31/12, 31/19***

**U.S. Cl. 260—520 E** **5 Claims**

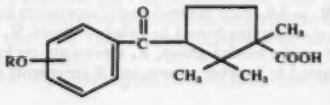
1. A compound having the formula;



wherein OR represents a member of the group consisting of 3′, 4′-dimethoxy, 3′, 4′-diethoxy and 4′-ethoxy.

4. A method for inducing an anorexigenic condition in man or animal which comprises administering to said man or animal an anorexigenic amount of a compound according to claim 1.

5. An anorexigenic composition comprising an anorexigenic amount of a compound having the formula:



wherein OR represents a member of the group consisting of 3′, 4′-dimethoxy, 3′, 4′-diethoxy, 4′-methoxy and 4′-ethoxy in association with a pharmaceutically acceptable carrier.

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4,025,553

## PRODUCTION OF O-HYDROXYBENZYL ALCOHOLS

Wataru Nagata, Nishinomiya; Kyo Okada, Osaka; Hiroshi Itazaki, Takarazuka, and Tsutomu Aoki, Takatsuki, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Filed Sept. 23, 1975, Ser. No. 615,884
Claims priority, application Japan, Oct. 9, 1974, 49-116469
Int. Cl.² C07C *7/00, 37/00, 51/00;* C07F *5/04*
U.S. Cl. 260—521 R 7 Claims

1. A process for producing o-hydroxybenzyl alcohols which comprises reacting (1) a phenol or naphthol selected from the group consisting of phenol, naphthol and phenol and naphthol having a free ortho-position and containing up to 4 substituent groups selected from the group consisting of alkyl of 1–5 carbon atoms, aryl of 6–10 carbon atoms, pyridyl, aralkyl of 7–10 carbon atoms, alkoxy of 1–5 carbon atoms, aryloxy or 6–10 carbon atoms, pyridyloxy, aralkoxy of 7–10 carbon atoms, halogen, carboxy, alkoxycarbonyl of 2–6 carbon atoms, nitro and cyano, said alkyl, aryl, pyridyl, aralkyl, alkoxy, aryloxy, pyridyloxy and aralkoxy groups being unsubstituted or substituted by alkyl, aryl, pyridyl, aralkyl, alkoxy, aryloxy, pyridyloxy, aralkoxy, halogen, carboxy, alkoxycarbonyl, nitro or cyano as defined above, with (2) an aromatic boronic acid selected from the group consisting of phenyl, tolyl, xylyl, methoxyphenyl, nitrophenyl and pyridyl boronic acids and their corresponding anhydrides and esters and (3) an aldehyde of the formula R—CHO where R is hydrogen, alkyl of 1–5 carbon atoms, aryl of 6–10 carbon atoms, or aralkyl of 7–10 carbon atoms in the presence of (4) a catalytic amount of an alkanoic acid of 2–6 carbon atoms, the alkyl group of which may be substituted by aryl of 6–10 carbon atoms, pyridyl, alkoxy or 1–5 carbon atoms, aralkoxy of 7–10 carbon atoms or halogen in (5) an anhydrous aprotic organic solvent, under reflux conditions with elimination of water as said water is formed, to produce a cyclic boronic acid ester, and degrading said cyclic boronic acid ester under alkaline or slightly acid conditions using a hydrogen ion doner.

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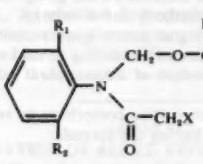
4,025,554

## HALOGENO-ACETANILIDES AS HERBICIDES

Jean Claude Tournayre, Basel, and Christian Vogel, Binningen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Aug. 28, 1972, Ser. No. 284,203
Claims priority, application Switzerland, Sept. 1, 1971, 12818/71
Int. Cl.² C07C *10/10*
U.S. Cl. 260—562 A 12 Claims

1. A compound of the formula I



(I)

wherein $R_1$ and $R_2$ each independently represents hydrogen or lower alkyl containing from 1 to 4 carbon atoms, $R_3$ represents hydrogen or the methyl group, $R_4$ represents cycloalkyl containing from 3 to 5 carbon atoms, and X represents chlorine or bromine.

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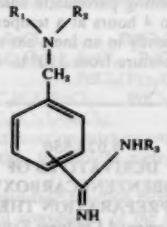
4,025,555

## AROMATIC AMIDINES AS ANTIVIRAL AGENTS IN ANIMALS

Allen R. Kraska, East Lyme, and Rodney C. Schnur, Noank, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Filed July 23, 1976, Ser. No. 708,180
Int. Cl.² C07D *123/00*
U.S. Cl. 260—564 R 13 Claims

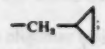
1. A compound of the structure



and the non-toxic acid addition salts thereof wherein

$R_1$ and $R_2$ are each alkyl of from 12 to 24 carbon atoms; and

$R_3$ is selected from the group consisting of hydrogen; alkyl of from one to six carbon atoms; alkenyl of from three to six carbon atoms; cycloalkyl of from three to eight carbon atoms; phenyl; phenylalkyl of from seven to nine carbon atoms;



and mono- and di-substituted phenyl wherein said substituents are selected from the group consisting of fluoro, chloro, bromo, hydroxyl, nitro, trifluoromethyl, alkyl and alkoxy of from one to three carbon atoms, dimethylamino, $-N(CH_3)_3^+ Cl^-$, $-SO_2NH_2$,

and $-SO_2R_4$, wherein $R_4$ is selected from the group consisting of alkyl of from one to three carbon atoms, provided that when said phenyl ring is di-substituted at least one of said substituents is selected from the group consisting of hydroxyl, alkyl and alkoxy of from one to three carbon atoms, and dimethylamino.

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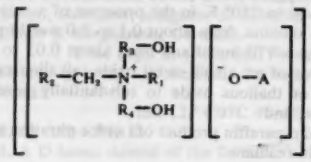
4,025,556

## QUATERNARY AMMONIUM-HYDROXYARYL COMPOUNDS

Max Schellenbaum, Muttenz, and Max Dünnenberger, Frenkendorf, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

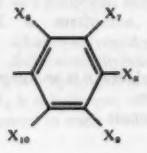
Continuation-in-part of Ser. No. 229,172, Feb. 24, 1972, abandoned, which is a continuation of Ser. No. 765,688, Oct. 7, 1968, abandoned. This application May 22, 1975, Ser. No. 579,999
Claims priority, application Switzerland, Oct. 16, 1967, 14446/67
Int. Cl.² C07C *93/06*
U.S. Cl. 260—567.5 8 Claims

1. A quaternary ammonium-hydroxyaryl compound of the formula



(1)

in which $R_1$ represents alkyl of 10 to 22 carbon atoms, $R_2$ represents phenyl or phenyl substituted by a member selected from the group consisting of halogen or alkyl of 1 to 4 carbon atoms, $R_3$ and $R_4$ each represents ethylene and A represents biphenyl, phenyl or a group of the formula



in which one to three of the $X_{6-10}$ represent halogen, at most two of the $X_{6-10}$ represent an alkyl of 1 to 4 carbon atoms and the remaining $X_{6-10}$ represents hydrogen.

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**4,025,557**

## PROCESS FOR THE PRODUCTION OF POLYAMINES

**Willi Eifler, New Martinsville, W. Va., and Hartmut Knöfel, Leverkusen-Schlebusch, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Continuation of Ser. No. 364,187, May 25, 1973, abandoned. This application Nov. 27, 1974, Ser. No. 527,551**

**Claims priority, application Germany, June 3, 1972, 2227110**

**Int. Cl.² C07C *85/145***

**U.S. Cl. 260—570 D** **16 Claims**

1. A process for the preparation of multi-nuclear aromatic polyamines which comprises the steps of

A. condensing an aromatic amine with formaldehyde in the presence of an aqueous acid catalyst and in the presence of water in a volumetric ratio of water to aromatic amine of at least 3:1, thereby producing an inhomogeneous reaction mixture comprising an aqueous phase containing the acid catalyst as ammonium salts of said aromatic amine, and an organic phase,

B. recovering polyamine from said organic phase, and

C. returning said aqueous phase containing the ammonium salt to step (A).

**4,025,558**

## ORGANIC COMPOUNDS

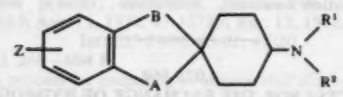
**Daniel Lednicer, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Division of Ser. No. 460,449, April 12, 1974, Pat. No. 3,932,425. This application Oct. 16, 1975, Ser. No. 623,171**

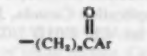
**Int. Cl.² C07C *97/10***

**U.S. Cl. 260—570.5 CA** **10 Claims**

1. A compound of the formula



wherein the sum of A and B is an integer of from 2 to 8; A is $-(CH_2)_n-$ wherein $n$ is 1 through 5; B is absent or $-(CH_2)_n-$ wherein $n$ is 1 through 3; $R^1$ is selected from the group consisting of hydrogen and lower alkyl of 1 through 3 carbon atoms; $R^2$ is



wherein $n$ is 2 through 5 and Ar is phenyl having zero through three substituents selected from the group consisting of lower alkyl of 1 through 3 carbon atoms, lower alkoxy of 1 through 3 carbon atoms, bromine, chlorine, and fluorine; Z is selected from the group consisting of hydrogen, lower alkyl of 1 through 3 carbon atoms, lower alkoxy of 1 through 3 carbon atoms, nitro, bromine, chlorine and fluorine; and a pharmacologically acceptable acid addition salt thereof.

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**4,025,559**

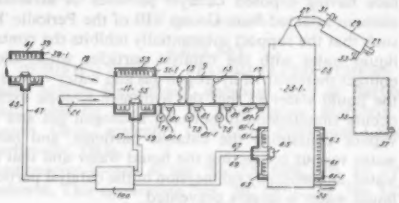
## METHOD FOR CONTINUOUS HYDROLYSIS OF POLYURETHANE FOAM IN RESTRICTED TUBULAR REACTION ZONE AND RECOVERY

**Olin B. Johnson, Bloomfield Hills, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed Dec. 18, 1972, Ser. No. 315,976**

**Int. Cl.² C07C *87/28***

**U.S. Cl. 260—578** **2 Claims**



1. A continuous process for converting particulate polyurethane foam to diamines and liquid polymeric hydrolysis product of said polyurethane and simultaneously separating said diamines from said liquid polymeric product by:

1. propelling a stream of particulate polyurethane foam into a first end of an enclosed tubular hydrolysis zone maintained at a temperature in the range of about 425° to about 750° F.

2. introducing water-vapor comprising hydrolysis gas into said first end of said hydrolysis zone under sufficient pressure to sweep through said hydrolysis zone and exit into an enclosed gas - liquid separation zone which has cross sectional area greater than said tubular hydrolysis zone and is in fluid communication with said tubular hydrolysis zone,

3. successively impeding the forward movement of particles

of polyurethane foam as they pass from said first end of said tubular reaction zone toward said gas - liquid separation zone with a series of two or more grids having apertures of cross sectional area which vary inversely with their distance from said first, end,

4. removing gaseous effluent from the upper half of said gas - liquid separation zone comprising water vapor and said diamines, and
5. removing said liquid polymeric hydrolysis product of said polyurethane foam from the lower half of said gas - liquid separation zone.

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## 4,025,560
## PROCESS FOR THE EXCHANGE OF HYDROGEN ISOTOPES BETWEEN STREAMS OF GASEOUS HYDROGEN AND LIQUID WATER

**John H. Rolston; William H. Stevens; James Denhartog, and John P. Butler, all of Deep River, Canada, assignors to Atomic Energy of Canada Limited, Ottawa, Canada**

**Continuation-in-part of Ser. No. 263,261, June 15, 1972, abandoned. This application Dec. 12, 1973, Ser. No. 424,172**
**Claims priority, application Canada, July 29, 1971, 119402**
**Int. Cl.² C01B 5/02**
**U.S. Cl. 423—580** **8 Claims**

1. A process for the exchange of hydrogen isotopes between streams of gaseous hydrogen and liquid water, comprising:

a. bringing the streams into contact with one another and a catalyst assembly at an operating temperature in the range 0° to 300° C, with one of the streams containing a concentration of a hydrogen isotope in excess of that which it would contain when the liquid water-gaseous hydrogen streams are in isotopic equilibrium at the operating conditions of temperature and mass flow rates of the streams and the other being a deficient stream and containing a concentration of that hydrogen isotope which is less than that which it would contain when the liquid water-gas system is in equilibrium at said operating conditions, so that the deficient stream is enriched by transfer of the hydrogen isotope in a two-step hydrogen isotope exchange from the other stream, and

b. recovering the said stream enriched in the hydrogen isotope, and wherein the improvement comprises:

c. the catalyst assembly comprises at least one porous, support of polytetrafluoroethylene, with the support surface having exposed catalyst particles of at least one element selected from Group VIII of the Periodic Table, such that the support substantially inhibits the contact of liquid water with the catalyst particles while allowing contact therewith of hydrogen gas and water vapour from the liquid water so that the hydrogen isotope exchange occurs simultaneously between hydrogen gas and water vapour containing the catalyst particles, and between water vapour contacting the liquid water and that liquid water, and whereby submersion of the catalyst particles in liquid water is largely prevented.

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## 4,025,561
## PROCESS FOR PRODUCING SECONDARY ALKYL PRIMARY AMINES FROM N-PARAFFIN

**Robert M. Suggitt, Wappingers Falls, and Walter C. Gates, Jr., Newburg, both of N.Y., assignors to Texaco Inc., New York, N.Y.**

**Division of Ser. No. 428,638, Dec. 26, 1973. This application Jan. 26, 1976, Ser. No. 652,582**
**Int. Cl.² C07C 85/11**
**U.S. Cl. 260—583 K** **11 Claims**

1. In a process for producing secondary alkyl primary amines from n-paraffin reactant wherein a portion of said n-paraffin is nitrated to form a nitroparaffin along with nitrated and oxygenated by-products, wherein said nitroparaffin is substantially hydrogenated to said amine and where said amine is separated from a mixture of unreacted paraffin and oxygenated by-products, the improvement which comprises:

a. catalytically hydrogenating said mixture of unreacted paraffin and oxygenated by-products at a temperature of from about 600 to 750° F. in the presence of a catalyst composed of alumina, from about 0.1 to 5.0 weight percent of a Group VIII metal and from about 0.05 to 2.0 weight percent of an alkali metal oxide, alkaline earth metal oxide or thallous oxide to substantially pure n-paraffin oxide; and

b. recycling said n-paraffin product of (a) for nitration with said n-paraffin reactant.

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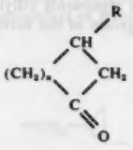
## 4,025,562
## PROCESS FOR THE PREPARATION OF MACROCYCLIC KETONES

**Pieter A. Verbrugge, and Willy Brunmayer-Schilt, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.**

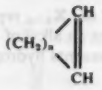
**Filed Nov. 4, 1974, Ser. No. 520,768**
**Claims priority, application United Kingdom, Nov. 14, 1973, 52775/73**
**Int. Cl.² C07C 45/00, 45/16**
**U.S. Cl. 260—586 P** **12 Claims**

1. A process for preparing a saturated cyclic ketone having the formula



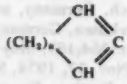
wherein R is hydrogen or $C_1$ to $C_8$ alkyl, and $n$ is an integer of from 9 to 17, which process comprises:

a. reacting a cyclic olefin of the formula

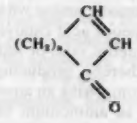


with a dihalocarbene in the presence of a catalyzing amount of an onium salt,

b. dehalogenating the dihalobicyclic compound formed in step (*a*) thereby producing a cyclic allene of the formula



c. hydrating and oxidizing the cyclic allene formed in step (*b*) thereby producing a cyclic unsaturated ketone of the formula



d. converting the double bond of said unsaturated cyclic ketone formed in step (*c*) to a single bond thereby producing the aforesaid saturated cyclic ketone.

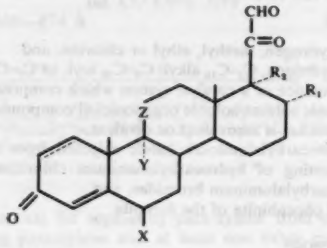
4,025,563

## NOVEL D-HOMO STEROIDS

Robert C. Nickolson; Ulrich Kerb, and Rudolf Wiechert, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

Filed Sept. 2, 1975, Ser. No. 609,706
Claims priority, application Germany, Sept. 4, 1974, 2442615
Int. Cl.² C07C 49/48
U.S. Cl. 260—586 E 15 Claims

1. A D-homo steroid of the formula




wherein
═ is a single bond or a double bond;
X is a hydrogen atom, a fluorine atom or methyl;
Y is a hydrogen atom, a fluorine atom or a chlorine atom;
Z is methylene, carbonyl, β-hydroxymethylene, β-alkanoyloxymethylene or, when Y is a chlorine atom, also β-fluoromethylene or β-chloromethylene;
$R_1$ is a hydrogen atom or methyl;
$R_2$ is a hydrogen atom, hydroxy, or alkanoyloxy;
alkanoyl in each instance being of 1–8 carbon atoms.

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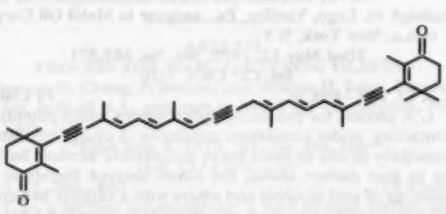
4,025,564

## TRIDEHYDRO-CANTHAXANTHIN

Michael Rosenberger, Caldwell, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 585,224, June 9, 1975, Pat. No. 4,000,198. This application Sept. 15, 1976, Ser. No. 723,416
Int. Cl.² C07C 49/48, 49/54
U.S. Cl. 260—586 R 1 Claim

1. A compound of the formula:




4,025,565

## PROCESS FOR PREPARING UNSATURATED ALDEHYDE HAVING THREE TO FOUR CARBON ATOMS

Yoshio Oda; Keiichi Uchida, both of Yokohama; Manabu Suhara, Tokyo, and Takeshi Morimoto, Yokohama, all of Japan, assignors to Asahi Glass Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 334,727, Feb. 22, 1973, Pat. No. 3,936,505. This application June 25, 1975, Ser. No. 590,152
Claims priority, application Japan, Feb. 22, 1972, 47-17653; Apr. 11, 1972, 47-35725; Apr. 17, 1972, 47-37800
Int. Cl.² C07C 45/02, 47/20
U.S. Cl. 260—604 R 6 Claims

1. A process for preparing an unsaturated aldehyde having three to four carbon atoms, which comprises:
reacting the corresponding olefin with molecular oxygen in a mole ratio of oxygen to olefin ranging from 3 : 1 to 1 : 5 in the vapor phase at a temperature of from 350° to 520° C and a pressure of 1 to 10 atms. in the presence of a metal oxide catalyst having the formula:

$$Mo_{12}—X_a—Te_b—Y_c—O_d$$

wherein X is Nb or Ta; Y is at least one metal selected from the group consisting of alkali metals, Cu, As, Sb, Fe and Ni; *a* is 0.2 to 9; *b* is 0.2 to 9; *c* is 0.01 to 9; *d* is determined by the oxidation states of the other components.

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4,025,566

## PROCESS FOR PREPARING MONOALKYL ETHERS OF DIHYDRIC PHENOLS

Shigeki Nagai; Hiroshi Yoshida, and Teruhiko Inoue, all of Ube, Japan, assignors to UBE Industries, Ltd., Ube, Japan

Filed Feb. 10, 1976, Ser. No. 656,938
Claims priority, application Japan, Mar. 14, 1975, 50-30064
Int. Cl.² C07C 41/00
U.S. Cl. 260—613 D 10 Claims

1. A process for preparing a monoalkyl ether of a dihydric phenol which comprises contacting from 2 to 0.1 part by weight of a dihydric phenol with one part by weight of a lower alcohol having from 1 to 4 carbon atoms with a catalyst comprising aluminum, boron and phosphorus at a temperature of from 250° to 350° C., the atomic ratio of Al:B:P in said catalyst being from 1:1:2 to 1:3:4.

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4,025,567

## PURIFICATION OF FLUORINATED ETHERS

William Milton Hutchinson, deceased, late of Bartlesville, Okla., and by Florence M. Hutchinson, executrix, Tahlequah, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 332,680, Feb. 15, 1973, abandoned. This application Nov. 20, 1974, Ser. No. 525,625
Int. Cl.² C07C 41/12
U.S. Cl. 260—616 19 Claims

1. A method for the purification and recovery of partially fluorinated dimethyl ethers from a mixture comprising difluoromethyl trifluoromethyl ether, bis(difluoromethyl) ether, difluoromethyl fluoromethyl ether, dimethyl ether, HF, and other impurities which comprises:
a. contacting said mixture with sulfuric acid having a concentration of at least 65 weight percent $H_2SO_4$ in an amount within the range of from about 1 to about 10 pounds of sulfuric acid per pound of said mixture at any reasonable temperature within an upper limit where decomposition of difluoromethyl fluoromethyl ether becomes excessive and a lower limit where viscosity of any stream involved hinders mixing or settling and at a pressure such that there is obtained a raffinate containing difluoromethyl trifluoromethyl ether, bis(difluoromethyl) ether, and fluoromethyl difluoromethyl ether, and an extract containing sulfuric acid, hydrofluoric acid, di-

fluoromethyl fluoromethyl ether, dimethyl ether, and other impurities; and

b. introducing water into said extract in an amount sufficient to form two substantially immiscible liquid layers which are separable by gravity and recovering as one layer sulfuric acid, hydrofluoric acid, dimethyl ether, and other impurities and as the second layer difluoromethyl fluoromethyl ether.

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**4,025,568**

## 4-HOMOISOTWISTYL BROMIDE

**Yoshiaki Fujikura; Yoshiaki Inamoto; Hiroshi Ikeda, and Naotake Takaishi, all of Wakayama, Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan**

**Filed Dec. 18, 1975, Ser. No. 641,895**

**Claims priority, application Japan, Dec. 23, 1974, 49-147807**

**Int. Cl.² C07C *23/20***

**U.S. Cl. 260—648 R** **2 Claims**

1. 4-homoisotwistyl-3-bromide.

2. A process for preparing 4-homoisotwistyl-3-bromide, which comprises stirring a mixture of (A) 4-homoisotwistane and (B) liquid bromine, at a molar ratio of A/B of from 1/5 to 1/10, at a temperature of from −20° C to +100° C, under a pressure effective to maintain (B) in the liquid state, the reaction being carried out in the absence of a solvent, and recovering 4-homoisotwistyl-3-bromide from the reaction mixture.

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**4,025,569**

## DIELS-ALDER ADDUCTS OF HEXAHALOCYCLOPENTADIENE AND DIALKYL-ALPHAMETHYLSTYRENE

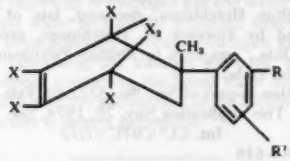
**Ellis K. Fields, River Forest, and Alfred Steitz, Jr., deceased, late of Batavia, Ill. (by Margaret Marie Steitz, executrix), assignors to Standard Oil Company (Indiana), Chicago, Ill.**

**Division of Ser. No. 402,486, Oct. 1, 1973, Pat. No. 3,903,144. This application Apr. 7, 1975, Ser. No. 565,846**

**Int. Cl.² C07C *25/18***

**U.S. Cl. 260—649 R** **5 Claims**

1. A compound having the structure



wherein each X is halogen, R and R′ are alkyl groups and R′ is either in the 4 or 5 position.

4. A method for producing the Diels-Alder adduct of claim 1 comprising

mixing hexabromocyclopentadiene or nexachlorocyclopentadiene and 3,5-dialkyl-α-methylstyrene or 3,4-dialkyl-α-methylstyrene in a molecular ratio ranging from about 1:5 to about 5:1;

heating the mixture to a temperature in the range from 80° C. to 180° C., for 1 hour to 24 hours at a pressure of from 15 pounds per square inch to 300 pounds per square inch;

distilling the mixture in vacuo at a pressure in the range of from 0.1 millimeter to 2 millimeters until the temperature of the reaction mixture is from 85° C. to 140° C; and

recrystallizing the adduct product crystals produced during distillation from a nonpolar solvent.

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**4,025,570**

## PREPARATION OF 1,4-DIENES OF HIGH TRANS-ISOMER CONTENT

**Richard David Cramer, Landenberg, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Jan. 9, 1976, Ser. No. 647,993**

**Int. Cl.² C07C *25/00***

**U.S. Cl. 260—651 R** **12 Claims**

1. Method of preparing 1,4-diene of high trans-isomer content which comprises contacting ethylene with 1,3-diene of the formula

$$CH_2{=}C(R^1)CH{=}CHR^2$$

or

$$CH_2{=}CHC(R^1){=}CHR^2$$

where

$R^1$ is hydrogen, methyl, ethyl or chlorine, and

$R^2$ is hydrogen, $C_1$–$C_{15}$ alkyl, $C_6$–$C_{12}$ aryl, or $C_7$–$C_{18}$ alkaryl,

in the presence of a catalyst system which comprises

a. organic solvent-soluble organonickel compound in which the nickel is zerovalent or divalent,

b. hydrocarbylaluminum halide selected from the group consisting of hydrocarbylaluminum chlorides and hydrocarbylaluminum bromides, and

c. aryl phosphinite of the formula

$$R^3R^4POR^5$$

where

$R^3$ and $R^4$, alike or different, are phenyl, or substituted phenyl containing up to two substituents selected from the group consisting of $C_1$–$C_8$ alkyl, chlorine, fluorine, bromine and iodine, and

$R^5$ is $C_6$–$C_{12}$ aryl or substituted $C_6$–$C_{12}$ aryl containing up to two substituents selected from the group consisting of $C_1$–$C_8$ alkyl, $C_1$–$C_8$ alkoxy, chlorine, bromine, iodine, fluorine, trifluoromethyl and di($C_1$–$C_8$ alkyl) amino.

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**4,025,571**

## MANUFACTURE OF HYDROCARBONS

**Rudolph M. Lago, Yardley, Pa., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed May 12, 1976, Ser. No. 685,870**

**Int. Cl.² C07C *1/20***

**U.S. Cl. 260—668 D** **9 Claims**

1. A process for producing hydrocarbons which comprises contacting, under conversion conditions, a charge consisting essentially of one or more lower monohydric alcohols having up to four carbon atoms, the ethers derived therefrom or mixtures of said alcohols and ethers with a catalyst comprising a crystalline aluminosilicate zeolite having a crystal size of at least about 1 micron, a silica to alumina ratio of about 12 and a constraint index within the approximate range of 1 to 12 to yield a reaction product mixture comprising $C_2$-$C_3$ olefins, monocyclic aromatic hydrocarbons and water and recovering said hydrocarbons.

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**4,025,572**

## MANUFACTURE OF HYDROCARBONS

**Rudolph M. Lago, Yardley, Pa., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed May 12, 1976, Ser. No. 685,871**

**Int. Cl.² C07C *1/20***

**U.S. Cl. 260—668 D** **10 Claims**

1. A process for producing hydrocarbons which comprises contacting, under conversion conditions, a charge consisting essentially of one or more lower monohydric alcohols having up to four carbon atoms, the ethers derived therefrom or mixtures of said alcohols and ethers with a catalyst bed comprising a major proportion of particle-form inert solid diluent

having intermixed therewith a crystalline aluminosilicate zeolite characterized by (1) a crystallite size not greater than 0.5 micron, (2) a particle size less than 2 millimeters in its smallest cross-sectional dimension, (3) a silica to alumina ratio of at least about 12 and (4) a constraint index within the approximate range of 1 to 12 to yield a reaction product mixture comprising $C_2$-$C_3$ olefins, monocyclic aromatic hydrocarbons and water and recovering said hydrocarbons.

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**4,025,573**

**SEPARATION PROCESS**

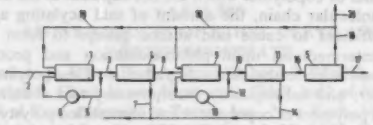
**John Trevor Hathway, Middlesbrough, England, assignor to Imperial Chemical Industries Limited, London, England**

**Filed Nov. 13, 1975, Ser. No. 631,607**

**Claims priority, application United Kingdom, Nov. 21, 1974, 50444/74**

**Int. Cl.² C07C *7/14***

**U.S. Cl. 260—674 A** **10 Claims**



1. A process for separating para-xylene from a mixture comprising para-xylene and at least one other component which is a xylene isomer present in amounts substantially at or about their eutectic ratios, which process is conducted in at least two stages comprising in the first stage, chilling the feedstock mixture to form a mixture of crystals and liquid, and separating crystals of para-xylene from the crystals of the other component or components, and which comprises, in the remaining stage or successive stages, chilling of the mother liquor from the immediately preceding stage to a temperature which is lower than that of the first stage followed by separation of the crystals formed, separation of the crystals in at least one stage of the process being by classification of the crystals according to their respective sizes, respective shapes or both.

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**4,025,574**

**HYDROCARBON SEPARATIONS**

**Donald C. Tabler, and Marvin M. Johnson, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Nov. 20, 1975, Ser. No. 633,885**

**Int. Cl.² C07C *7/16***

**U.S. Cl. 260—677 A** **6 Claims**

1. A process for the separation of unsaturated aliphatic hydrocarbons having from 2 to about 25 carbon atoms from admixture with saturated hydrocarbons comprising contacting a mixture of saturated and said unsaturated hydrocarbons with a 0.5 to 2 molar solution of a copper (I) salt of an alkylbenzenesulfonic acid wherein the alkyl group contains from 1 to 16 carbon atoms in a hydrocarbon solvent selected from paraffinic and aromatic hydrocarbons having from 5 to about 15 carbon atoms under such conditions that said unsaturated hydrocarbons are preferentially complexed with said copper (I) salt while the saturated hydrocarbons remain uncomplexed, and recovering said unsaturated hydrocarbons from the resulting complex containing same.

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**4,025,575**

**PROCESS FOR MANUFACTURING OLEFINS**

**Clarence D. Chang, Princeton, and William H. Lang, Pennington, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.**

**Filed Apr. 8, 1975, Ser. No. 566,166**

**Int. Cl.² C07C *1/20***

**U.S. Cl. 260—682** **12 Claims**

1. In a method for converting a feed to light olefins, said feed comprising one or more compounds selected from the group consisting of the lower monohydric alcohols with up to four carbon atoms and their simple and mixed ether derivatives, said method comprising: passing said feed at a space velocity of about 1.0 to about 50 L.H.S.V. over a catalyst contained in a reaction zone, said catalyst comprising a crystalline aluminosilicate zeolite having a constraint index of 1.0 to 12.0, a silica to alumina ratio of at least about 12 and a dried crystal density in the hydrogen form of not substantially less than about 1.6 grams per cubic centimeter, with the temperature in said reaction zone at about 500° F to about 1000° F; withdrawing from said reaction zone an effluent comprising a conjunct mixture of light olefins, paraffin hydrocarbons and aromatic hydrocarbons; and segregating said light olefins from said effluent; the improvement, whereby increasing the selectivity for said light olefins, which comprises:

passing said feed over said catalyst at subatmospheric inlet partial pressure of said feed, referred to alcohols, of about 0.1 p.s.i.a. to about 12 p.s.i.a.

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**4,025,576**

**PROCESS FOR MANUFACTURING OLEFINS**

**Clarence D. Chang, Princeton, and William H. Lang, Pennington, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 566,166, April 8, 1975. This application July 3, 1975, Ser. No. 593,139**

**Int. Cl.² C07C *1/20***

**U.S. Cl. 260—682** **12 Claims**

1. In a multistage method for producing gasoline from a feed comprising methanol and/or dimethyl ether, which method comprises: contacting said feed with a first stage catalyst comprising a crystalline aluminosilicate zeolite having a constraint index of 1 to 12 and a silica to alumina ratio of at least about 12, at a temperature of 600° to 900° F, a L.H.S.V. of 0.05 to 200, thereby converting said methanol and/or dimethyl ether to a first stage conversion product comprising steam and hydrocarbons comprising light olefins; contacting in a subsequent stage said first stage conversion product with a subsequent stage zeolite catalyst having a constraint index of 1 to 12 and a silica to alumina ratio of at least 12, said contacting being under aromatizing conditions at an elevated temperature up to about 1290° F, and a pressure of 0–1,000 p.s.i.g., thereby forming a subsequent stage conversion product; and recovering gasoline or gasoline blending stock from said subsequent stage product; the improvement, whereby reducing the durene content of said recovered gasoline or gasoline blending stock, which comprises, in combination:

contacting said feed with said first stage catalyst at a subatmospheric inlet partial pressure of said feed, referred to methanol, of about 0.1 p.s.i.a. to about 12 p.s.i.a., and at a temperature and space velocity effective to convert at least 85% of said feed to said hydrocarbons.

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**4,025,577**

**HYDROALKYLATION OF PARAFFINS WITH OLEFINS UTILIZING HYDROGEN FLUORIDE AND METAL PENTAFLUORIDE CATALYST**

**Michael Siskin, Maplewood, and Joseph J. Porcelli, Scotch Plains, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.**

**Filed June 12, 1975, Ser. No. 586,176**

**Int. Cl.² C07C *3/54***

**U.S. Cl. 260—683.51** **15 Claims**

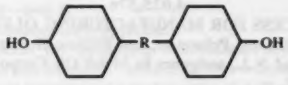
1. An alkylation process wherein i-$C_4$-$C_{12}$ aliphatic hydrocarbons are alkylated with olefins under substantially anhydrous alkylation conditions and in the presence of hydrogen and of a catalyst comprising (a) a metal fluoride selected from the group consisting of tantalum pentafluoride, niobium pentafluoride and mixtures thereof, and (b) hydrogen fluoride, and forming an alkylate product having an octane number greater than that of the feedstock.

## 4,025,578
## ELASTOMERIC LIQUID POLYMER VULCANIZATES FROM EPOXY RESIN, LIQUID CARBOXY TERMINATED POLYMER, DIHYDRIC PHENOL, AND AN AMINE

Alan R. Siebert, Maple Heights, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Continuation-in-part of Ser. No. 391,219, Aug. 24, 1973, abandoned. This application May 9, 1975, Ser. No. 576,045
Int. Cl.² C08L *33/00, 63/02*
U.S. Cl. 260—837 R 12 Claims

1. A cured elastomeric vulcanizate comprising (A) a resinous particulate phase consisting essentially of (1 ) a major amount of an epoxy resin having an average of from 1.7 to 2.3 epoxide groups per molecule and an epoxide equivalent weight of from about 150 to about 1000, (2) a minor amount of a dihydric compound selected from the group consisting of catechol, resorcinol, hydroxybenzyl alcohols, bis-benzylic alcohol, dihydroxynaphthalenes, and bisphenols of the formula




where R is an alkylene group containing 1 to 12 carbon atoms or a bivalent radical containing 1 to 8 atoms of C, O, S, and/or N, (3 ) a small amount of a liquid carboxylterminated polymer having a polymeric backbone consisting of carbon-carbon linkages and having a weight percent carboxyl content based upon the weight of the polymer of from about 0.5 percent to about 10 percent and a bulk viscosity of from about 500 centipoises to about 2,000,000 centipoises, and (4) as the only curing agent a small amount of one or more amines selected from the group consisting of aliphatic amines and aliphatic heterocyclic amines, said particles having a diameter ranging from about 100 A to about 5$\mu$ in width, and (B) a continuous elastomeric phase comprising (1) a major amount of the defined liquid polymer, (2) a minor amount of the defined epoxy resin, (3) a small amount of the defined dihydric compound, and (4) as the only curing agent a small amount of one or more of the defined amines, said vulcanizate having a total composition of 100 parts by weight of epoxy resin, from about 100 parts to about 250 parts by weight of liquid carboxyl-terminated polymer, from about 3 parts to about 36 parts by weight of dihydric compound, and from about 2 parts to about 10 parts by weight of amine.

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## 4,025,579
## PROCESS FOR THE PRODUCTION OF SHEET-LIKE STRUCTURES

Hermann Gruber, Leverkusen; Alois Fehlbier, Burscheid, and Hans-Dieter Ruprecht, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Sept. 23, 1975, Ser. No. 616,102
Claims priority, application Germany, Oct. 5, 1974, 24476253
Int. Cl.² C08L *75/00*
U.S. Cl. 260—858 6 Claims

1. Process for the production of elastic sheet-like structures, in which a polyurethane binder which hardens under the action of moisture and which is based on polyethers which contain hydroxyl groups and polyisocyanates is mixed with rubber and/or elastomeric synthetic resin granulates and optionally other auxiliary agents and additives and the mixture is hardened by water after it has been shaped, characterized in that the moisture hardening polyurethane binder based on hydroxyl polyethers and polyisocyanates used is a reaction product which has free isocyanate groups and is obtained by reacting these components at an NCO/OH ratio of from 2:1 to 15:1 and, in that from 20 to 80% by weight of the polyisocyanate component consists of 2,4'-diisocyanatodiphenylmethane.

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## 4,025,580
## MODIFIED STYRENEPOLYMERS

Lynn J. Taylor, Haslett, Mich., assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Dec. 18, 1972, Ser. No. 315,798
Int. Cl.² C08L *25/18*
U.S. Cl. 260—874 10 Claims

1. A process for preparing mixtures of chemically modified styrene polymers or copolymers and unmodified polystyrene which comprises preparing said chemically modified styrene polymers or copolymers by reacting a styrene polymer or copolymer with an acylating agent in the presence of a Lewis Acid catalyst so as to introduce ketone groups into positions in the polymer or copolymer which are not adjacent to the atoms of the molecular chain, the amount of said acylating agent being sufficient to cause said ketone groups to form free radical intermediates upon photo-excitation and promote environmental photo-oxidative degradation of the polymer or copolymer; and subsequently incorporating said chemically modified polymers or copolymers into unmodified polystyrene in an amount sufficient to promote environmental photodegradation of the unmodified polymer.

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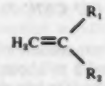
## 4,025,581
## BARRIER RESINS AND IMPACT MODIFIERS THEREFOR

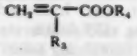
John A. Powell, Willingboro, N.J., and Alan Williams, Richboro, Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 248,147, April 27, 1972, Pat. No. 3,939,223. This application Sept. 9, 1975, Ser. No. 611,749
Int. Cl.² C08L *51/00, 53/00*
U.S. Cl. 260—880 R 3 Claims

1. An impact modifier composition comprising a graft copolymer of (A) from 20 to 60 weight percent of a superstrate polymer polymerized from a monomer mixture comprising from 50 to 90 weight percent acrylonitrile, from 5 to 28 weight percent of vinylidene aromatic monomer of the formula




wherein $R_1$ is hydrogen, chlorine or methyl and $R_2$ is a substituted or unsubstituted aromatic radical having from 6 to 10 carbon atoms and from 2 to 25 weight percent of an olefinic ester of the formula




and (B) from 80 to 40 weight percent of a substrate polymer having a glass transition temperature of less than −40° C. comprising from 50 to 100 weight percent of a conjugated diene selected from the group consisting of 1,3-butadiene and isoprene, from 50 to 0 weight percent of an ethylenically unsaturated monomer selected from the group consisting of vinylidene aromatic monomer, acrylonitrile, and mixtures thereof, and from 0 to 10 weight percent of olefinic ester, provided that said superstrate polymer is at least about 50 percent grafted onto said substrate polymer.

4,025,582
ULTRAVIOLET-STABILIZED POLYOLEFIN COMPOSITIONS
Donald G. Needham, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.
Filed July 3, 1975, Ser. No. 593,140
Int. Cl.² C08L 23/06, 23/08
U.S. Cl. 260—897 R 9 Claims

1. A polymer composition being UV-stabilized consisting essentially of a mixture of
a. a polyolefin selected from the group consisting of homopolymers and copolymers of one or more 1-olefins having 2 to 8 carbon atoms per molecule, and
b. a stabilizing amount of poly(phenylene sulfide).

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4,025,583
AMINE ADDUCTS OF ETHYL OLEYL ACID ORTHOPHOSPHATE
Theodore C. Mead, Port Arthur; Richard T. McDill, Houston; Ralph P. Chesluk, and Norman R. Odell, both of Nederland, all of Tex., assignors to Texaco Inc., New York, N.Y.
Division of Ser. No. 455,447, March 27, 1975, Pat. No. 3,979,308. This application Jan. 12, 1976, Ser. No. 648,595
Int. Cl.² C07F 9/09
U.S. Cl. 260—925 2 Claims

1. A composition of matter comprising ethyl oleyl acid orthophosphate and the adduct of an amine of the formula:

wherein the substituents are either hydrogen, alkyl or aryl groups having up to 30 carbon atoms.

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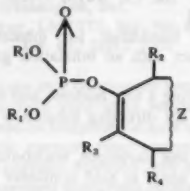
4,025,584
1-ACETYL-3(4)-(DIHYDROCARBYLPHOSPHORYLOXY)-CYCLOHEX-3-ENES
Kaspar F. Burri, West Caldwell, N.J.; Frank Kienzle, Therwil, Switzerland, and Perry Rosen, North Caldwell, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.
Division of Ser. No. 497,598, Aug. 15, 1974, Pat. No. 3,933,948. This application Oct. 2, 1975, Ser. No. 618,853
Int. Cl.² C07F 9/09; A01N 9/36
U.S. Cl. 260—946 5 Claims

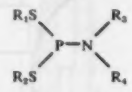
1. A compound of the formula



wherein each of $R_1$ and $R_1'$ is lower alkyl, aryl or benzyl, each of $R_2$, $r_3$ and $R_4$ is hydrogen or lower alkyl and Z is the residue of a dienophile moiety selected from the group consisting of methyl vinyl ketone.

4,025,585
S,S-DIALKYL-N-SUBSTITUTED PHOSPHOROAMIDODITHIONITES
Francis J. Freenor, III, Richmond, Calif., assignor to Chevron Research Company, San Francisco, Calif.
Division of Ser. No. 565,924, April 7, 1975, Pat. No. 3,959,271, which is a division of Ser. No. 466,433, May 2, 1974, Pat. No. 3,886,238, which is a division of Ser. No. 219,559, Jan. 20, 1972, Pat. No. 3,832,424. This application Mar. 1, 1976, Ser. No. 662,313
Int. Cl.² C07F 9/24; A01N 9/36
U.S. Cl. 260—956 6 Claims

1. A compound of the formula



wherein $R_1$ and $R_3$ are independently alkyl of 1 to 8 carbon atoms or alkenyl of 2 to 8 carbon atoms, $R_2$ is hydrogen or alkyl of 1 to 4 carbon atoms and $R_4$ is alkenyl of 2 to 4 carbon atoms or aryl of 6 to 15 carbon atoms substituted with 0 to 5 halogen atoms of atomic number 9 to 35 or alkyl groups of 1 to 4 carbon atoms.

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4,025,586
PREPARATION OF DIALKYL PHOSPHOROCHLORIDOTHIOATES
Alfred E. Lippman, Creve Coeur, Mo., assignor to Monsanto Company, St. Louis, Mo.
Filed Apr. 21, 1976, Ser. No. 678,803
Int. Cl.² C07F 9/20
U.S. Cl. 260—986 2 Claims

1. In a method for the preparation of dialkyl phosphorochloridothioate which comprises chlorinating dialkyl phosphorodithioic acid in a reaction vessel to yield a reaction mixture comprising said dialkyl phosphorochloridothioate, bis(thiophosphono)sulfide intermediate, sulfur and impurities associated with said chlorination and distilling said reaction mixture to provide a distillate consisting essentially of said dialkyl phosphorochloridothioate and a distillation residue comprising said bis(thiophosphono)sulfide intermediate, sulfur and said impurities; the improvement which comprises
a. removing solid sulfur from said distillation residue;
b. washing the remaining residue with water to selectively hydrolyze said impurities;
c. removing from said residue said selectively hydrolyzed impurities;
d. drying said washed residue such that its water content is below about 2 percent by weight; and
e. recycling said dried residue to said reaction vessel.

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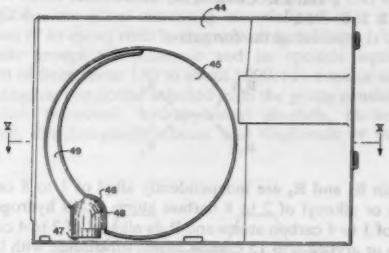
4,025,587
AIR HUMIDIFIER
Donald R. Schuster, Columbus, Ohio, assignor to White-Westinghouse Corporation, Cleveland, Ohio
Continuation of Ser. No. 459,738, April 10, 1974, abandoned. This application Feb. 3, 1976, Ser. No. 654,951
Int. Cl.² B01F 3/04
U.S. Cl. 261—30 4 Claims

1. An apparatus for adding humidity to an air flow comprising; an axial flow fan; motor means for rotating said fan; a shroud substantially surrounding said fan for assuring that a relatively lower pressure exists on the upstream side of said fan when said fan operates by impeding air flow from the downstream to the upstream side of said fan; a sump adapted to be supplied with water, said sump disposed below said shroud; a continuous channel shaped duct means comprising a concave bowl portion adjacent said sump and a concave scroll portion extending partly around the fan opening within the periphery of said shroud and extending upwardly from in fluid

flow communication with siad bowl portion, said duct means connected with the shroud and located within the periphery of the shroud with its open side of the channel shape facing the upstream or low pressure side of said fan and with a part of the bowl portion opening at or near the water surface level of said sump, so that said channel shaped concave duct communicates said lower pressure with said sump when said fan rotates causing water to be aspirated through said bowl portion and along said scroll portion from said sump and dispersed by said



fan into the exhaust of said fan; said scroll portion gradually decreasing in cross-sectional area from the sump up to a location adjacent the top of the shroud where it merges with said shroud so that the water dispersed radially by said fan is redirected into said air flow by said scroll portion; and a porous pad positioned downstream from said fan to intersect said exhaust causing additional dispersement of said water and substantially filtering from said water matter and foreign particles carried therein.

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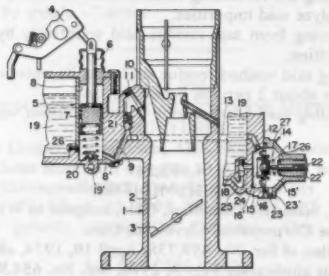
**4,025,588**

## CARBURETORS UTILIZING AN ACCELERATION PUMP AND A METHOD THEREFOR

**Norihiko Nakamura, Mishima, and Hiromichi Yanagihara, Susono, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan**

**Filed Oct. 7, 1975, Ser. No. 620,491**
**Claims priority, application Japan, June 19, 1975, 50.74271**
**Int. Cl.² F02M *7/08***
**U.S. Cl. 261—34 A** **17 Claims**



1. In a carburetor having an acceleration pump, acting in conjunction with the throttle valve of the carburetor, for injecting fuel into the fuel-air mixture chamber of the carburetor through an injection channel containing an injection restrictor in the opening of the injection channel into the fuel-air mixture chamber, the improvement comprising:

a fuel accumulator containing a diaphragm under bias forming a diaphragm chamber in the accumulator,

a branch channel interconnecting said diaphragm chamber to said injection channel between said acceleration pump and said injection restrictor, and

a connection channel between said diaphragm chamber and a fuel supply, said connection channel including a check valve.

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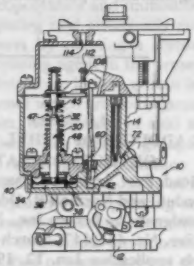
**4,025,589**

## METERING ROD SUPPORT FOR CARBURETOR

**Larry J. Tipton, Florissant, Mo., assignor to ACF Industries, Incorporated, New York, N.Y.**

**Filed Sept. 2, 1975, Ser. No. 609,295**
**Int. Cl.² F02M *7/16***
**U.S. Cl. 261—69 A** **8 Claims**



1. A carburetor for an internal combustion engine comprising:

a. a body structure having an air and fuel mixture conduit therethrough;

b. a throttle valve mounted across said mixture conduit for movement between open and closed position;

c. a fuel nozzle within the mixture conduit, a fuel supply bowl adjacent the mixture conduit, a fuel passage between the supply bowl and the fuel nozzle, a metering jet within the fuel passage defining a metering orifice, a vertically extending metering rod having a lower end portion positioned within the orifice to control the flow of fuel to the fuel nozzle,

d. an integral one-piece hanger member wholly supporting the metering rod and continuously urging the metering rod in a generally lateral direction to maintain contact between the outer periphery of the metering rod and the adjacent surface defining the orifice, and

e. a fixed support means to support the said hanger member, and an adjusting screw between the hanger member and the fixed support means to adjust the height of said metering rod relative to said metering jet.

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**4,025,590**

## SELF-SEALING HUMIDIFIER FOR INHALATION THERAPY

**Victor Igich, 2022 44th Ave., Gulfport, Miss. 39501**

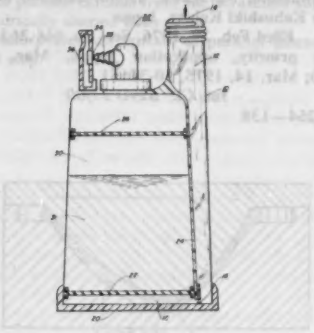
**Filed June 10, 1976, Ser. No. 694,624**
**Int. Cl.² A61M *15/00***
**U.S. Cl. 261—122** **4 Claims**

1. Self-sealing humidifier for inhalation therapy and adapted to connect with an inhalation gas cyclinder, comprises:

a. container having a top, bottom, and sides with a vertical interior duct for directing inhalation gas to the bottom thereof;

b. a pair of flexible partitions, horizontally fixed and vertically spaced apart in said container for defining a top space, a double bottom, and a liquid chamber therebetween, said partitions having a multiplicity of minute slits adapted to remain closed in a normal absence of inhalation gas pressure, thereby sealing said fluid chamber when said humidifier is not in use; and

c. sterile liquid partially filling said fluid chamber and retained therein when in use by the passage of tiny gas



bubbles continuously therethrough and out silently and humidified for inhalation therapy.

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4,025,591

## BONDING EXPLOSIVE FILLERS WITH ANAEROBIC CURING BINDERS

Daniel O. Pendergast, Arlington, Tex., assignor to Jet Research Center, Inc., Arlington, Tex.

Continuation of Ser. No. 460,852, April 15, 1974, abandoned.
This application Nov. 10, 1975, Ser. No. 630,463
Int. Cl.² C06B 21/00
U.S. Cl. 264—3 R 8 Claims

1. A process for the production of a solid, bonded composition consisting essentially of:

mixing, in the presence of air, a solid particulate material selected from primary explosives, secondary explosives and pyrotechnics with a liquid binding material to produce a dry, free-flowing blend of granular solids, wherein said liquid binding material is comprised of a mixture of an organic peroxide catalyst and an anaerobic curing monomer selected from esters of acrylic acid, esters of methacrylic acid and polymerizable polyacrylate esters, and wherein the weight ratio of said binding material to said particulate material is in the range of about 25 to 75 to about 0.01 to 99.99;

placing at least a portion of said blend of granular solids in a mold of any desirable shape; and

compressing said granular solids in said mold at a pressure sufficient to substantially exclude entrained oxygen from said blend to thereby form said solid bonded composition and to initiate curing of said binding material.

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4,025,592

## ADDITION OF DIETHYLENE GLYCOL IN CONTINUOUS PRODUCTION OF POLYESTER YARN

David E. Bosley, Grifton, N.C., and Patrick J. Duncan, Hendersonville, Tenn., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 13, 1975, Ser. No. 604,110
Int. Cl.² D01F 1/04
U.S. Cl. 264—78 4 Claims

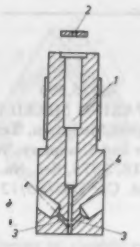
1. An improvement in a continuous process for producing polyester texturing feed yarn from ethylene glycol and dimethyl terephthalate or terephthalic acid in which a polymer of less than 3 mole percent ether content is prepared and melt-spun to form partially oriented yarn or fully drawn yarn, wherein the improvement comprises adding diethylene glycol to increase the ether content of the polymer by an amount within the range of 0.1 to 2 mole percent to correct for nonuniformity in dyeability of products prepared from the feed yarn.

4,025,593

## FABRICATION OF DISCONTINUOUS FIBRILS

Carlo Raganato, Castiglioncello, Italy, and Georges Voituron, Vilvoorde, Belgium, assignors to Solvay & Cie, Brussels, Belgium

Continuation of Ser. No. 277,033, Aug. 1, 1972, abandoned.
This application June 9, 1975, Ser. No. 585,441
Claims priority, application Luxembourg, Aug. 6, 1971, 63673
Int. Cl.² B29C 17/06
U.S. Cl. 264—94 13 Claims



1. In a process for the manufacture of a fibrillated structure by the abrupt pressure release of a liquid mixture of molten polymer and solvent which is at a temperature and pressure such as to be in the form of a system of two phases consisting of a continuous liquid phase, which is poor in polymer and a second liquid phase dispersed therein which is rich in polymer, the abrupt pressure release taking place in a device which creates high losses and bringing about the instantaneous vaporization of the solvent and the solidification of the said polymer normally in the form of a continuous fibrillated structure, the improvement which comprises introducing a diluent fluid into the two-phase liquid mixture in the device before the pressure release is completed so that the abrupt pressure release results in the production of discontinuous fibrils instead of a continuous fibrillated structure.

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4,025,594

## METHOD FOR PRODUCTION OF HOLLOW ARTICLES FROM INJECTION MOLDED PREFORMS

Purushottam D. Agrawal, Bloomfield, Conn., assignor to Monsanto Company, St. Louis, Mo.

Filed Sept. 23, 1975, Ser. No. 615,998
Int. Cl.² B29C 17/07, 25/00
U.S. Cl. 264—97 12 Claims

1. In the method for the production of a hollow article by thermoforming a tubular, elongated injection molded preform made of thermoplastic material selected from the group consisting of styrene polymers, nitrile polymers, olefin polymers, acrylate polymers and polyester polymers and having a finished neck portion adjacent an open end and a closed end body portion the improvement comprising annealing said

preform prior to thermoforming into said article by heating the portion of said preform body adjacent the neck which portion comprises up to about 40% of the total length of the preform body to a temperature of from about 50° F below Tg up to about Tg of such material while maintaining the remainder of the preform body at a temperature of from about ambient temperature to about 55° F below Tg for such material for a sufficient time to essentially relieve the internal stresses in said body portion adjacent the neck.

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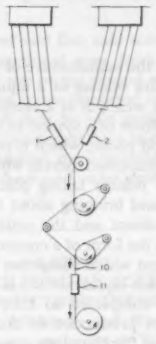
**4,025,595**

## PROCESS FOR PREPARING MIXED FILAMENT YARNS

**Michael E. Mirhej, Signal Mountain, Tenn., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Oct. 15, 1975, Ser. No. 622,754**
**Int. Cl.² D01D *5/12***
**U.S. Cl. 264—103** **12 Claims**



1. A process for preparing continuous, mixed filament yarns having 20–68 filaments and a denier of 70–260
which comprises cospinning at least two different bundles of continuous filaments, separately entangling each bundle, consolidating the entangled bundles and drawing them together to yield from about 0.5–6 entanglements/meter after drawing, and then intermingling the drawn yarn to a degree of filament intermingling of about 45–80%.

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**4,025,596**

## METHOD FOR PELLETIZING FINELY DIVIDED SOLIDS

**Christ F. Parks, and Kenneth H. Nimerick, both of Tulsa, Okla., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Oct. 3, 1973, Ser. No. 403,127**
**Int. Cl.² B01J *2/12***
**U.S. Cl. 264—117** **7 Claims**

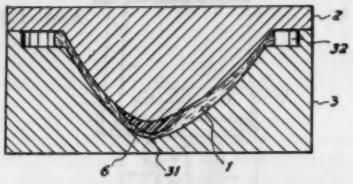
1. A method for pelletizing finely divided mineral solids, comprising:
a. blending said finely divided mineral solids with a water dispersible agglutinant dispersed in an aqueous film forming latex of a water insoluble interpolymer of an alkenyl aromatic monomer, an open chain conjugated diolefin of from 4 to 9 carbon atoms and a monoethylenically unsaturated carboxylic acid,
b. forming pellets of said mineral solids and blend, and
c. drying said formed pellets.

**4,025,597**

## METHOD OF MAKING BRASSIERE CUP

**Koshi Sawamoto, Neyagawa, Japan, assignor to Sawamoto Sangyo Kabushiki Kaisha, Japan**

**Filed Feb. 23, 1976, Ser. No. 660,362**
**Claims priority, application Japan, Mar. 14, 1975, 50-31650; Mar. 14, 1975, 50-31651**
**Int. Cl.² B29D *27/00***
**U.S. Cl. 264—138** **5 Claims**




1. A method of making a brassiere cup having a wall thickness which is greater at the apex portion than at the peripheral portion, by press-shaping a soft fibre board intermixed with thermoplastic resin with a set of male and female dies which are heated to a temperature substantially higher than the softening temperature of said thermoplastic resin and forming a predetermined mold cavity when closed, a pad of rounded configuration overlying the apex portion of said male die, whereby the gap between the top of said projection and the female die becomes significantly less than the wall thickness of the product at the corresponding portion when the dies are closed, and the temperature of said pad is maintained substantially lower than the softening temperature of said thermoplastic resin.

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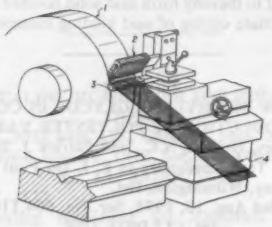
**4,025,598**

## METHOD OF PRODUCING THREADS OR FIBERS OF SYNTHETIC MATERIALS

**Franz Sasshofer, Ried i.I.; Friedrich Gotschy, Vocklabruck; Johannes Krässig, Seewalchen, and Adalbert Wimmer, Vocklabruck, all of Austria, assignors to Chemigfaser Lenzing Aktiengesellschaft, Lenzing, Austria**

**Filed Dec. 18, 1975, Ser. No. 642,016**
**Claims priority, application Austria, Jan. 3, 1975, 20/75**
**Int. Cl.² B29D *7/18***
**U.S. Cl. 264—140** **12 Claims**



1. A method of producing threads and fibers of synthetic polymer materials. which have high-melting points, which hve no melting point, which are difficult to dissolve or which are insoluble, comprising the steps of:
rotating a cylindrically shaped body of said synthetic material against a scratching tool carrying a plurality of scratching edges so as to scratch a plurality of parallel grooves into the surface of the cylindrically shaped body,
holding a peeling knife against said cylindrically shaped body, said knife being arranged to follow said scratching

tool in the direction of rotation of said cylindrically shaped body of synthetic material so as to peel off a curtain of parallel threads from the scratched surface of the cylindrically shaped body, and

stretching said peeled off curtain of parallel threads in at least one step.

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**4,025,599**

## CUSPATED SHEET FORMING

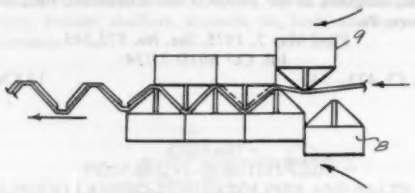
**Donald George Keith, Mount Eliza, Australia, assignor to ICI Australia Limited, Australia**

**Continuation of Ser. No. 482,982, June 25, 1974, abandoned, which is a continuation-in-part of Ser. No. 307,211, Nov. 16, 1972, abandoned. This application Apr. 20, 1976, Ser. No. 678,713**

**Claims priority, application Australia, Nov. 29, 1971, 7210/71; Mar. 8, 1972, 8206/72; Apr. 13, 1972, 8598/72; June 29, 1972, 9523/72**

**Int. Cl.² B29B** *3/02*; **B29C** *17/03*

**U.S. Cl. 264—167** **5 Claims**



1. A continuous process of deforming a sheet of thermoplastic material by sequentially pressing against one face of a molten sheet of the material at a temperature below its decomposition point the cold tips of projections set in and extending normally from a first series of separately moveable combs and sequentially pressing against the second face of the material the cold tips of projections set in and extending normally from a second series of separately moveable combs so that the projections on the first series of combs interpenetrate with the projections on the second series of combs in such a manner that the projections of the first series are spaced from the projections of the second series by a distance greater than the thickness of the sheet; the interpenetrated projections are substantially parallel during the act of interpenetration; and the combs of any one series form a block pressing against the sheet of thermoplastic material, wherein the block so formed by the combs of any one series has two straight parallel side, parallel with the sides of the thermoplastic sheet and has non-linear projections running across the block having a median normal to the parallel sides of the block said projections characterized in that an envelope around any one projection overlaps with the envelope around an adjacent projection; the combs each contain one or more complete projections; and wherein the interpenetrated combs are moved along at the speed of the sheet until the sheet is set and the combs are then removed and recycled and wherein the temperature of the cold tips of the projection is at all times during the interdigitation process less than the softening point of the thermoplastic material.

**4,025,600**

## JOINTING OR TERMINATING PLASTICS SHEATHED ELECTRIC CABLES

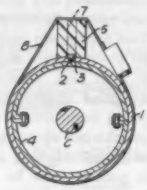
**David Turner Parr, Croft, near Warrington, England, assignor to Bicc Limited, London, England**

**Filed May 6, 1976, Ser. No. 683,957**

**Claims priority, application United Kingdom, May 6, 1975, 19015/75**

**Int. Cl.² B29C** *5/00*; **B29D** *9/00*, *23/08*, *23/10*

**U.S. Cl. 264—262** **16 Claims**



1. A method for enclosing an electric cable splice, comprising:

forming a thermoplastic sheet substantially into a tubular sleeve having adjacent edges and disposing said sleeve about said splice, disposing a support member between said splice and said sleeve, said edges of said sleeve being chamfered so that adjacent said edges have a groove therebetween extending longitudinally of said cable, disposing a mold member against said sleeve so as to enclose said groove, while supporting said sleeve internally with said support member injecting a molten thermoplastic material into said mold member and into said groove, said molten material being compatible with the material of said sleeve and at a temperature sufficient to soften said sleeve, and cooling said molten material, thereby forming a bond between said material and said sleeve; removing said support member and sealing at least one separately formed end closure member to said sleeve and to said cable.

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**4,025,601**

## PROCESS OF DRAWING A SHAPED PLASTIC SHEET HAVING HOLLOW POINTED PROJECTIONS

**Donald George Keith, Mount Eliza, Australia, assignor to ICI Australia Limited, Australia**

**Filed May 13, 1974, Ser. No. 469,662**

**Claims priority, application Australia, May 29, 1973, 3474/73**

**Int. Cl.² B29C** *17/02*

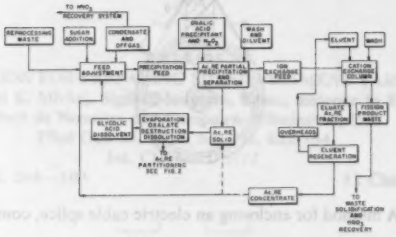
**U.S. Cl. 264—291** **7 Claims**

1. A process of cold drawing a shaped plastic sheet wherein said sheet has a plurality of hollow pointed projections on one or both faces arranged in an array that forms parallel rows in at least one direction, said hollow pointed projections having at least a portion of the distal portion of the sides at an angle of over 60° to the median plane of the sheet which process comprises cold drawing said shaped plastic sheet by stretching the sheet along an axis in the median plane of the sheet and normal to a direction of parallel rows of projections, to thereby produce an oriented plastic sheet containing projections which remain incompletely drawn.

## 4,025,602
## RECOVERY OF TRANSPLUTONIUM ELEMENTS FROM NUCLEAR REACTOR WASTE

David O. Campbell, Oak Ridge, and Samuel R. Buxton, Wartburg, both of Tenn., assignors to The United States of America as represented by The United States Energy Research and Development Administration, Washington, D.C.

Filed May 25, 1976, Ser. No. 689,888
Int. Cl.² C01G 56/00
U.S. Cl. 423—7 5 Claims



1. In a two step process for separating actinide values from a nitric acid nuclear fuel reprocessing waste stream containing actinide values, lanthanide values, and other metal values comprising a first partitioning step to provide a trivalent fraction enriched in actinide and lanthanide values and a first waste product substantially free of actinide values, and an actinide/lanthanide partitioning step in which said trivalent fraction is partitioned to provide an actinide waste product and a second waste product substantially free of actinides; the improvement wherein said first partitioning step comprises:

a. adjusting the nitric acid concentration of said reprocessing waste to about 0.1–1.0 M;

b. contacting said reprocessing waste with an excess of a source of oxalate ions to cause a major portion of said actinide and lanthanide values to precipitate as solid oxalates providing a supernate solution of the remaining actinide and lanthanide values and the major portion of said other metal values in the presence of dissolved oxalate;

c. separating oxalate precipitate from said supernate solution to provide a trivalent fraction for said actinide/lanthanide partitioning step;

d. contacting the supernate solution with a strong acid ion exchange resin to cause the loading of actinide and lanthanide values onto said resin, providing a raffinate substantially free of actinides; and

e. eluting actinide and lanthanide values from the loaded resin with about 3 to 6 M $HNO_3$ to provide an eluate solution.

## 4,025,603
## METHODS OF PURIFYING GAS CONTAINING NITROGEN OXIDE, AND COMPOSITIONS USED THEREFOR

Tsuneo Shibata, Yamatokoriyama; Masao Maki, Nabari; Masao Suzuki, Nara, and Hidehiko Kawabe, Kashiwara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Oct. 21, 1974, Ser. No. 516,869
Claims priority, application Japan, Oct. 19, 1973, 48-118281; Dec. 18, 1973, 48-142889; Dec. 28, 1973, 49-2897
Int. Cl.² B01D 53/04
U.S. Cl. 423—239 6 Claims

1. A dry method of purifying a gas containing nitrogen monoxide, nitrogen dioxide or a mixture thereof, which comprises passing the gas through a kneaded and granulated composition containing calcium hydroxide, sodium chlorite and calcium sulfate.

## 4,025,604
## METHOD OF REMOVING NITROGEN OXIDES FROM EXHAUST GAS BY REDUCTION

Sanseki Moriguchi; Hiroshi Abe, both of Yokohama; Taisuke Nishida, Kawasaki; Jyoichi Takenaka, Yokohama; Makoto Miyazawa, Yokohama, and Sadayoshi Iwabuchi, Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

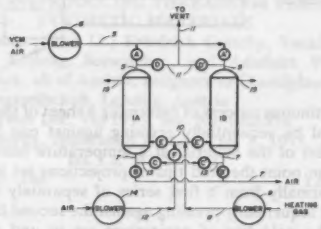
Filed Dec. 16, 1974, Ser. No. 533,154
Claims priority, application Japan, Jan. 14, 1974, 49-7305
Int. Cl.² B01D 53/34
U.S. Cl. 423—239 7 Claims

1. A method of removing a nitrogen oxide from an exhaust gas by reduction in the presence of ammonia and a catalyst, which comprises: contacting, at a temperature of from about 300° C. to about 370° C., the exhaust gas and ammonia with an iron-oxide-containing catalyst having a grain size between about 32 mesh and about 10 mm, said catalyst being unsupported and uncompressed and being selected from the group consisting of magnetically separated blast furnace dust, iron ore, sintering plant dust, dust obtained from a top-blowing oxygen converter device, Si-Mn-Fe ferroalloy scale, and Mn-Fe ferroalloy scale.

## 4,025,605
## METHOD FOR REMOVING LOW CONCENTRATIONS OF OXIDIZABLE ORGANIC CONTAMINANTS FROM AN OXYGEN-CONTAINING INERT GAS

Augustine I. Dalton, Jr., and Shivaji Sircar, both of Allentown, Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed May 7, 1975, Ser. No. 575,345
Int. Cl.² B01D 53/34
U.S. Cl. 423—240 13 Claims



1. A method for removing low concentrations of oxidizable organic contaminants from an oxygen-containing inert gas which comprises:

a. adsorbing in a reaction zone having an inlet and outlet said oxidizable contaminants onto a sorptive media which is in intimate contact with an oxidation catalyst selected from the group consisting of platinum metal, palladium metal and the salts thereof or mixtures of same by passing said gas through said inlet and said sorptive media;

b. removing the resulting decontaminated gas from said outlet;

c. interrupting the passage of said oxygen-containing inert gas through said sorptive media by closing said inlet and outlet when the contaminants in said decontaminated gas reaches the desired concentration;

d. desorbing said contaminants by the application of indirect heat to said sorptive media;

e. oxidizing the desorbed contaminants in the presence of said oxidation catalyst and the oxygen in said oxygen-containing inert gas remaining in the voids of said reaction zone to innocuous reaction products;

f. venting and purging the innocuous reaction products from said reaction zone; and

g. cooling said reaction zone to ambient conditions.

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4,025,606

CATALYSIS

Gary James Keith Acres, London, England, assignor to Johnson Matthey & Co., Limited, London, England

Continuation-in-part of Ser. No. 265,272, June 22, 1972, Pat. No. 3,839,225. This application July 3, 1974, Ser. No. 485,764

Claims priority, application United Kingdom, June 25, 1971, 29883/71; June 25, 1971, 29884/71

Int. Cl.² B01D *53/34*

U.S. Cl. 423—245 23 Claims

1. A process for the oxidation of carbon monoxide or a hydrocarbon present in a gas stream together with uncombined oxygen, to carbon dioxide and water, the process comprising passing the said gas stream at an elevated temperature through a supported catalyst consisting essentially of an inert material, an intermediate coating thereon containing at least one oxide selected from the group consisting of the oxides of scandium, yttrium and the lanthanides and a catalytically active surface coating on said intermediate coating of an alloy selected from the group consisting of platinum/rhodium/base metal alloys wherein the rhodium constitutes 1–50 weight % of the total metal content of the alloy, the base metal from 0.01 to 25 weight % of said total metal content and the platinum the balance, the base metal being selected from the group consisting of aluminium, magnesium, chromium, molybdenum, tungsten, manganese, iron, cobalt, nickel, titanium, vanadium, thorium, uranium, copper, silver, zinc, cadmium, mercury, indium, thallium, bismuth, tin, lead, antimony and neodymium.

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4,025,607

PROPARGYL-SUBSTITUTED 2-PHENYLAMINO-2-IMIDAZOLINES AND SALTS THEREOF

Helmut Stähle; Herbert Köppe; Werner Kummer, all of Ingelheim am Rhein; Klaus Stockhaus, Bingen (Rhine); Wolfgang Hoefke, Budenheim, and Franz Josef Kuhn, Bingen (Rhine), all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

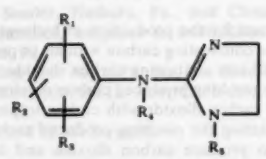
Filed May 17, 1976, Ser. No. 687,250

Claims priority, application Germany, May 24, 1975, 2523103

Int. Cl.² C07D *233/50*

U.S. Cl. 424—273 8 Claims

1. A compound of the formula



wherein

$R_1$, $R_2$ and $R_3$ are each hydrogen, fluorine, chlorine, bromine, methyl, ethyl or methoxy or trifluoromethyl when sterically possible, and one of

$R_4$ and $R_5$ is propargyl and the other is hydrogen,

or a non-toxic, pharmacologically acceptable acid addition salt thereof.

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4,025,608

ION EXCHANGE MATERIAL

David S. Tawil, Wilmslow; Michael H. Clubley, and Frank Farnworth, both of Bolton, all of England, assignors to Magnesium Elektron Limited, Swinton, England

Filed Dec. 16, 1974, Ser. No. 533,291

Claims priority, application United Kingdom, Dec. 27, 1973, 59749/73

Int. Cl.² C01B *15/16, 25/26*

U.S. Cl. 423—305 7 Claims

1. A method of preparing granular zirconium phosphate of a predetermined particle size distribution which comprises

reacting a solid substantially water-insoluble zirconium salt other than zirconium phosphate and having said predetermined particle size distribution with a liquid medium comprising phosphoric acid or a phosphate, said phosphoric acid or phosphate being present in an amount sufficient to give a zirconium phosphate having a phosphate to zirconium mole ratio from 1.0 to 2.0; and

thereby obtaining a granular zirconium phosphate having the particle size of said starting zirconium salt and a phosphate to zirconium mole ratio of 1.0 to 2.0.

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4,025,609

PROCESS FOR PREPARING STABLE SODIUM PERCARBONATE

Kinjiro Matsunaga, Funabashi, Japan, assignor to Kao Soap Co., Ltd., Tokyo, Japan

Filed Feb. 26, 1976, Ser. No. 661,699

Claims priority, application Japan, May 19, 1975, 50-59487

Int. Cl.² C01B *3/02, 31/00;* D06L *9/42;* C01B *3/26*

U.S. Cl. 423—415 P 9 Claims

1. In a process for preparing stable sodium percarbonate which comprises mixing sodium carbonate or an aqueous solution thereof, with an aqueous solution of hydrogen peroxide, to effect a reaction therebetween to form sodium percarbonate and recovering the produced crystals of sodium percarbonate from the reaction mixture, the improvement which comprises; one of said aqueous solutions contains dissolved or dispersed therein, prior to said mixing, from 0.001 to 10 weight percent of a chelating agent selected from the group consisting of oxine, salicylaldoxime, α-benzoinoxime, cupferon, aluminon, anthranilic acid, α-nitroso-β-naphthol, β-nitroso-α-naphthol, 2-methyloxine, 5-methyloxine, 6-methyloxine, 7-methyloxine, 8-hydroxy-2-phenylquinone, 1-hydroxyacyzine, 7-allyl-8-quinolinol, 7-allyl-5-nitroso-8-quinolinol, 5,7-dichlorooxine, 5,7-dibromooxine, quinaldic acid, quilinone-8-carboxylic acid, benzoylphenylhydroxylamine, salicylic acid, β-resorcinolic acid, p-aminosalicyclic acid, 5-nitrosalicylic acid, 3-bromosalicylic acid, 5-bromo-1-resorcinolic acid, 1-hydroxy-2-naphthoic acid, 1-hydroxy-4-bromo-2-naphthoic acid, 1-nitroso-2-hydroxy-3-naphthoic acid and 2-hydroxy-1-naphthoaldehyde, and from 0.001 to 0.5 weight percent of an anionic surface active agent selected from the group consisting of higher fatty acid salts, higher alcohol sulfates, alkylsulfonates, alkyldisulfonates, sulfonated oils and sulfonated fatty acid salts, sulfates of polyoxyethylenealkylethers, sulfates of alkylolamides of higher fatty acids, salts of sulfoalkyl compounds of higher fatty acids, alkylbenzenesulfonates, alkylphenolsulfonates, alkylnaphthalenesulfonates, and alkyldiphenylsulfonates wherein the number of carbon atoms in the alkyl, fatty acid and fatty alcohol moieties are from 8 to 18, or a nonionic surface active agent selected from the group consisting of ethylene oxide addition products of higher fatty acids, ethylene oxide addition products of higher alcohols, ethylene oxide addition products of higher alkylamines, ethylene oxide addition products of higher fatty acid amines, ethylene oxide addition products of higher alkylmercaptans, ethylene oxide addition products of alkylphenols, glycerin esters of higher fatty acids, glycol esters of higher fatty acids, pentaerythritol esters of higher fatty acids, sorbitan esters of higher fatty acids, and ethylene oxide addition products of sorbitan esters of higher fatty acids wherein

the number of carbon atoms in the alkyl, fatty acid and alcohol moieties are from 8 to 18, wherein both percentage ranges are based on the total weight of an aqueous solution containing said sodium carbonate and an equivalent amount of hydrogen peroxide.

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**4,025,610**

**METHOD AND APPARATUS FOR DENITRIFYING COKE**

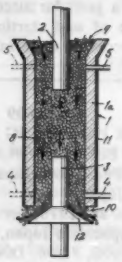
**Gyoichi Suzuki, Tokyo; Ryo Ando, Yokohama; Hideyuki Yoshikoshi, Tokyo; Seishiro Nagaoka, Kawasaki, and Yogiro Yamaoka, Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 13, 1974, Ser. No. 532,726**

**Claims priority, application Japan, Dec. 15, 1973, 48-139285; Dec. 15, 1973, 48-140931**

**Int. Cl.² C01B *31/02*; H05B *1/00***

**U.S. Cl. 423—461** **19 Claims**



1. A method for denitrifying metallurgical coke, wherein a metallurgical coke is packed into a vertical furnace having a coke loading opening at the upper end thereof and a coke discharge opening at the lower end thereof,

characterized in that

an electric current is passed along the coke loading-discharge line is said furnace between a pair of electrodes positioned at the upper and lower portions of said furnace in a downward and an upward direction, respectively, to generate Joule heat in said packed coke at a temperature greater than 1400° C. for more than 10 minutes in an inert or reducing atmosphere.

11. Apparatus for denitrifying metallurgical coke, comprising

a vertical furnace having a coke loading opening at the upper end thereof and a coke discharge opening at the lower end thereof,

characterized in that

a pair of electrodes are positioned in said furnace, one electrode being positioned at the upper portion thereof in a downward direction and the other electrode of the pair being positioned at the lower portion thereof in an upward direction, whereby electric current passed between said electrodes heats said metallurgical coke packed in said furnace by Joule heat generated by said current.

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**4,025,611**

**PROCESS FOR OBTAINING HYPERFINE MAGNETITE POWDER**

**Franco Montino, Casale Monferrato (Alessandria); Luigi Colombo, Arona (Novara), and Giuseppe Sironi, Novara, all of Italy, assignors to Montedison Fibre S.p.A., Milan, Italy**

**Filed Feb. 24, 1975, Ser. No. 552,604**

**Claims priority, application Italy, Feb. 25, 1974, 48635/74**

**Int. Cl.² C01G *49/02*, *49/08***

**U.S. Cl. 423—632** **3 Claims**

1. A process for producing magnetite having an equiaxial morphology in the state of a hyperfine powder, starting from an aqueous suspension of $Fe(OH)_2$ prepared by reacting an aqueous solution of a ferrous salt with alkali, characterized in that:

a. said aqueous suspension of $Fe(OH)_2$ is fed into an autoclave into which is also introduced a quantity of air corresponding to 4–15 normal liters per 100 g of bivalent Fe; and

b. the autoclave is then brought to a temperature between 150° and 200° C and maintained at this temperature, in the presence of $Cu^{++}$ ion in a quantity between 0.3 and 1.4% by weight of the bivalent Fe, until the inside pressure has stabilized itself at a constant level, thereby bringing about the formation of magnetite having a mean diameter of about 0.1$\mu$ which is removed from the autoclave, and then washed and dried.

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**4,025,612**

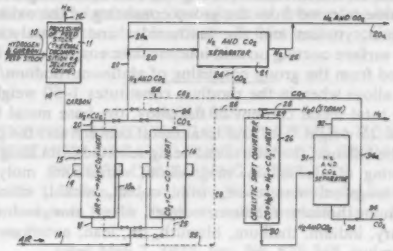
**PROCESS FOR THE PRODUCTION OF HYDROGEN**

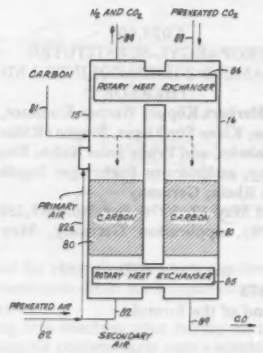
**Everett M. Barber, Wappingers Falls, N.Y., assignor to Texaco Inc., New York, N.Y.**

**Filed Dec. 13, 1974, Ser. No. 532,338**

**Int. Cl.² C01B *1/08*, *31/18*, *31/20*; C01C *1/04***

**U.S. Cl. 423—655** **9 Claims**






1. In a process for the production of hydrogen which process comprises combusting carbon with air to produce a combustion gas effluent containing carbon dioxide and nitrogen, separating the resulting produced carbon dioxide and reacting the separated carbon dioxide with carbon to produce carbon monoxide, reacting the resulting produced carbon monoxide with steam to produce carbon dioxide and hydrogen and separating the resulting produced hydrogen, the improvement which comprises maintaining a bed of particulate carbon in a combustion zone, preheating air to a temperature above 900° F. by passage through a first refractory heat regenerative mass, reacting said preheated air with said particulate carbon to produce a combustion effluent containing carbon dioxide and nitrogen, cooling the combustion gas effluent to below reaction temperature by passage through a second refractory

heat regenerative mass, separating the carbon dioxide from the nitrogen, preheating carbon dioxide to a temperature above 900° F. by passage through said second refractory heat regenerative mass, reacting said preheated carbon dioxide with carbon to produce carbon monoxide and cooling the product carbon monoxide by passage through said first refractory heat regenerative mass.

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**4,025,613**

## TIMED-RELEASE ASPIRIN

**Michael G. Guy, Ferdonia, and Richard G. Powers, Saukville, both of Wis., assignors to Richard G. Powers, Saukville; Michael G. Guy, Ferdonia; James F. Stern and Robert M. Stern, both of Milwaukee, all of, Wis.**

**Division of Ser. No. 435,418, Jan. 22, 1974, Pat. No. 3,906,086, which is a continuation of Ser. No. 163,739, July 19, 1971, abandoned. This application June 25, 1975, Ser. No. 590,095**

**Int. Cl.² D04H *1/16***

**U.S. Cl. 424—21** **7 Claims**

1. A method for making a multi-layer aspirin tablet including at least one layer having timed-release characteristics comprising:

a. mixing uncoated particles of standard 80 mesh U.S.P. aspirin with a non-aqueous solution comprised of about 5 to about 18 weight % cellulose acetate phthalate, a pharmaceutically acceptable plasticizer and a pharmaceutically acceptable solvent, the amount of said solution being sufficient to coat and impregnate each of the particles with said solution;

b. forming the resultant mixture into discrete granules;

c. drying said granules to remove substantially all of said solvent therefrom;

d. reducing the resultant granules to a size whereby they can pass through a 20 mesh screen;

e. homogenizing said reduced granules by mixing;

f. forming a first layer of said reduced granules containing no tabletting excipients;

g. forming a second layer of standard U.S.P. aspirin particles adjacent said first layer; and

h. compressing said layers together in a tabletting press to form said multi-layer aspirin tablet.

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**4,025,614**

## SUBSTITUTED 2H-PYRAN-2,6 (3H)-DIONE DERIVATIVES USEFUL IN TREATMENT OF ALLERGIC REACTIONS

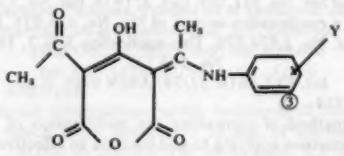
**Kenneth M. Snader, Hatboro, Pa., and Chester R. Willis, Kingston, Jamaica, assignors to SmithKline Corporation, Philadelphia, Pa.**

**Filed Apr. 30, 1976, Ser. No. 681,945**

**Int. Cl.² A01N *9/28*; A61L *9/04*; C07D *231/42*, *309/22***

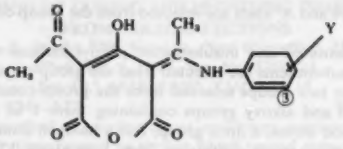
**U.S. Cl. 424—45** **15 Claims**

1. A compound of the formula:



wherein Y represents sulfamyl, methylsulfonamido, phenylsulfonamido or sulfamido, or a mono-or di-alkali metal salt of said compound.

5. A pharmaceutical composition for inhibiting the symptoms of asthma comprising a nontoxic pharmaceutical carrier or diluent and a therapeutically effective amount to produce said inhibition of a compound of the formula:



wherein Y represents sulfamyl, methylsulfonamido, phenylsulfonamido or sulfamido, or a mono-or di-alkali metal salt of said compound.

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**4,025,615**

## ANTIPERSPIRANT COMPLEXES FORMED WITH ALKALI METAL AND AMMONIUM ZIRCONYL CARBONATES

**Andrew M. Rubino, New Providence, N.J., assignor to Armour Pharmaceutical Company, Phoenix, Ariz.**

**Filed Feb. 25, 1975, Ser. No. 552,823**

**Int. Cl.² A61K *9/14***

**U.S. Cl. 424—46** **12 Claims**

1. A stable, water soluble complex formed by reacting in aqueous medium components (a) and (b) as follows:

a. a zirconyl carbonate selected from the group consisting of alkali metal zirconyl carbonate, ammonium zirconyl carbonate and mixtures thereof, and

b. a water soluble, polyvalent metal salt of a strong acid, said polyvalent metal being selected from the group consisting of zirconium, aluminum, zinc, magnesium, calcium and mixtures thereof, whereby the zirconium in said zirconyl carbonate is converted to an acid, active antiperspirant species, said zirconyl carbonate being present in an amount of about 2 to 35 weight percent of the complex, the total zirconium in the complex comprising about 2 to 40 weight percent of the complex, and said polyvalent metal salt being present in an amount such that the complex will have a pH satisfactory for application to the human skin in an antiperspirant composition.

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**4,025,616**

## ORAL COMPOSITIONS FOR PLAQUE, CARIES AND CALCULUS RETARDATION WITH REDUCED STAINING TENDENCIES

**John William Haefele, Sarasota, Fla., assignor to The Procter & Gamble Company, Cincinnati, Ohio**

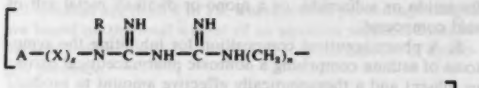
**Continuation of Ser. No. 338,464, March 6, 1973, abandoned, which is a continuation-in-part of Ser. No. 267,816, June 30, 1972, abandoned. This application Nov. 25, 1975, Ser. No. 635,030**

**The portion of the term of this patent subsequent to Jan. 20, 1993, has been disclaimed.**

**Int. Cl.² A61K *7/18*, *7/22***

**U.S. Cl. 424—52** **21 Claims**

1. An oral composition effective in inhibiting the formation of plaque, caries and calculus, said composition comprising a carrier suitable for use in the oral cavity and from about 0.01% to about 2.5% by weight of a water-soluble bis-biguanide compound having the generic formula:



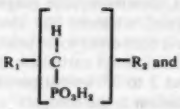
wherein A and A′ each are selected from the group consisting of

A. substituted and unsubstituted phenyl radicals wherein the substituents are selected from the group consisting of up to two groups selected from the group consisting of alkyl and alkoxy groups containing from 1 to about 4 carbon atoms, a nitro group, and a halogen atom;

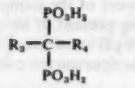
B. an alkyl group containing from 1 to about 12 carbon atoms; and

C. alicyclic groups containing from 4 to about 12 carbon atoms;

wherein X and X′ each represent an alkylene radical containing from 1 to 3 carbon atoms; wherein $z$ and $z'$ each are selected from the group consisting of 0 and 1; wherein R and R′ each are selected from the group consisting of hydrogen, an alkyl radical containing from 1 to about 12 carbon atoms, and aralkyl radical containing from 7 to about 12 carbon atoms; wherein $n$ is an integer from 2 to 12 inclusive; wherein the polymethylene chain $(CH_2)_n$ can be interrupted by up to 5 moieties selected from the group consisting of ether, thioether, phenyl, and naphthyl; wherein L is a number from about 1 to 4; and wherein Y is an anion which will form a pharmaceutically acceptable water-insoluble bis-biguanide compound, said anion being derived from a compound selected from the group consisting of bisulfites, polymaleates, phosphites, hypophosphites, perfluorooctanoates, silicates, sorbates, salicylates, maleates, tartrates, citrates, fumarates, ethylenediamine tetraacetates, iminodiacetates, cinnamates, thiocyanates, arginates, pyromellitates, tetracarboxybutyrates, benzoates, glutarates, perfluoropropionates and polyphosphonates selected from the group consisting of:

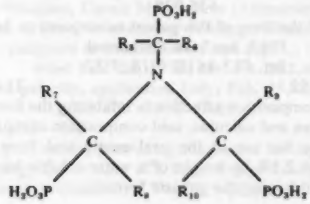


(I)



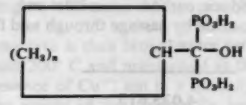
(II)

wherein in both formulae $R_1$ and $R_2$ are selected from the group consisting of hydrogen and $CH_2OH$; $n$ is an integer of from 3 to 12; $R_3$ is selected from the group consisting of hydrogen, alkyl containing from 1 to about 20 carbon atoms, alkenyl containing from 2 to about 20 carbon atoms, phenyl, naphthyl, phenylethenyl, benzyl, halogen, amino, dimethylamino, diethylamino, N-hydroxy-N-ethylamino, acetylamino, $-CH_2COOH$, $-CH_2PO_3H_2$, $-CH(PO_3H_2)(OH)$ and $-CH_2CH(PO_3H_2)_2$; and $R_4$ is selected from the group consisting of hydrogen, lower alkyl, amino, benzyl, halogen, hydroxyl, $-CH_2COOH$, $-CH_2PO_3H_2$, and $-CH_2CH_2PO_3H_2$;



(III)

wherein $R_5$, $R_6$, $R_7$, $R_8$, $R_9$, and $R_{10}$ are each selected from the group consisting of hydrogen and lower alkyl;

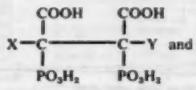


(IV)

wherein $n$ is an integer from 3 to 9;

(V)

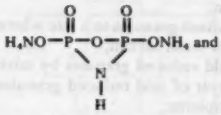
carboxyphosphonates selected from the group consisting of



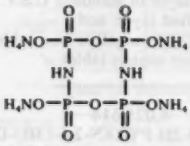
(VI)

(VII)

wherein X and Y are each selected from the group consisting of hydrogen and hydroxy; and the condensation products of ammonia and phosphorous pentoxide, said condensation products consisting of the compounds



(VIII)



(IX)

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**4,025,617**

**ANTI-MICROBIAL QUATERNARY AMMONIUM CO-POLYMERS**

**Harold A. Green, Havertown, Pa.; John J. Merianos, Jersey City, and Alfonso N. Petrocci, Glen Rock, both of N.J., assignors to Millmaster Onyx Corporation, New York, N.Y.**

**Division of Ser. No. 511,759, Oct. 3, 1974, Pat. No. 3,928,323, which is a continuation-in-part of Ser. No. 425,931, Dec. 18, 1973, Pat. No. 3,874,870. This application July 7, 1975, Ser. No. 593,735**

**Int. Cl.² A61K *31/74*; A01N *9/00*, *9/22***

**U.S. Cl. 424—78** **1 Claim**

1. A method of controlling the proliferation of bacteria which comprises applying to said bacteria an effective amount

sufficient to inhibit their growth of a product formed by the condensation of a mixture of difunctional tertiary amines and a molar quantity of 1,4-dichloro-2-butene that is substantially equal to the molar sum of the mixture of the difunctional tertiary amines, said mixture of difunctional tertiary amines being selected from the group consisting of (a) 1,4-bis-(dimethylamino)-2-butene and N,N'-di-lower alkyl piperazine, (b) 1,4-diazabicyclo (2.2.2) octane and 1,4-di-(N-homopiperidino)-2-butene, (c) 1,4-bis-(dimethylamino)-2-butene and 1,4-bis-(N-homo-piperidino)-2-butene, (d) 1,4-bis-(dimethylamino)-2-butene, 1,4-bis-(N-homopiperidino)-2-butene and N,N'-di-lower alkyl piperazine, (e) 1,4-bis-(dimethylamino)- 2-butene, N,N'-di-lower alkyl piperazine and 1,4-diazabicyclo (2.2.2) octane, and (f) 1,4-bis-(dimethylamino)-2-butene and 1,4-diazabicyclo (2.2.2) octane, each difunctional tertiary amine being present in a molar proportion of between about 10% and about 90% in the mixture of difunctional tertiary amines.

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**4,025,618**

## METHOD FOR SEPARATION OF CRYOPRECIPITATE FROM BLOOD PLASMA

**Jan W. Garber, Palatine, and De Wayne G. Davisson, Mount Prospect, both of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.**

**Division of Ser. No. 503,018, Sept. 3, 1974, Pat. No. 3,986,506. This application Mar. 29, 1976, Ser. No. 671,515**

**Int. Cl.² A61K** *35/16, 37/00;* **C07G** *7/00*

**U.S. Cl. 424—101** **10 Claims**

1. In the method of blood collection which comprises passing blood plasma containing Factor VIII into a blood compatible, sealed container; freezing said blood plasma within said sealed container to cause the precipitation of Factor VIII-rich cryoprecipitate; and thawing said blood plasma, the improvement comprising passing the thawed blood plasma, under conditions to prevent the substantial redissolving of said cryoprecipitate, through filtering means, said filtering means comprising a depth filter made of open-celled foam, said depth filter being positioned within said container to obstruct an outlet therefrom, whereby cryoprecipitate-poor plasma is transferred from said container through said outlet, and said cryoprecipitate is retained on the filtering means within said container.

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**4,025,619**

## BROAD SPECTRUM ANTIBIOTICS

**David Perlman, Madison, Wis.; Michel Alfred Sylvestre, Ville de Leval, Canada, and Takuo Sakai, Osaka, Japan, assignors to Wisconsin Alumni Research Foundation, Madison, Wis.**

**Filed Oct. 17, 1975, Ser. No. 623,413**

**Int. Cl.² A61K** *35/74*

**U.S. Cl. 424—115** **4 Claims**

1. A process for the preparation of a broad spectrum extracellular antibiotic (Factor I) comprising cultivating Mycoplasma sp. RP III ATCC 31166 in nutrient medium until a sufficient amount of antibiotic has been produced, adjusting the pH of the fermentation medium to a pH of about 4.5 , heating the medium for a short period of time to a temperature within the range of 25°–65° C, and then extracting an antibiotic at a pH of about 4.5.

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**4,025,620**

## TREATMENT OF CANINE OTITIS AND COMPOSITION THEREFOR

**Detlef Beyer, Fredensborg; Anton Pedersen Linnet, Ballerup, and Gerhard Thomsen, Farum, all of Denmark, assignors to Leo Pharmaceutical Products Ltd. A/S, Ballerup, Denmark**

**Filed Oct. 22, 1975, Ser. No. 625,626**

**Int. Cl.² A61K** *35/70, 31/71, 31/56*

**U.S. Cl. 424—115** **5 Claims**

1. A liquid composition for the treatment of canine otitis externa which comprises 2.5 to 10 mg. of diethanolamine fusidate, 50,000 to 200,000 I.U. of nystatin, 2.5 to 10 mg. neomycin B sulphate, 1 to 20 mg. of prednisolone, and a sufficient amount of a vegetable oil such that the resulting admixture is in liquid form, said amounts being based on one gram of the liquid composition.

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**4,025,621**

## METHOD OF CURING AND PROVIDING IMMUNITY FROM VIRAL INFECTIONS

**Clarence L. Purdy, 7705 Vicar St., New Carrollton, Md. 20784**

**Filed Jan. 9, 1975, Ser. No. 539,923**

**Int. Cl.² A61K** *33/00, 33/42, 33/16*

**U.S. Cl. 424—127** **12 Claims**

1. A method of treating upper and lower respiratory tract viral infections caused by viruses which spread extracellularly comprising administering an effective amount of a water soluble beryllium salt to a subject injected with a viral infection.

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**4,025,622**

## NOVEL SUGAR UREIDE AND THIOUREIDE DERIVATIVES

**Haruo Ogura, and Hiroshi Takahashi, both of Tokyo, Japan, assignors to Haruo Ogura, Tokyo, Japan**

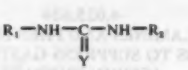
**Filed Feb. 26, 1975, Ser. No. 553,121**

**Claims priority, application Japan, Mar. 6, 1974, 49-25108; Sept. 30, 1974, 49-111631**

**Int. Cl.² A61K** *31/13;* **C07H** *5/04*

**U.S. Cl. 424—180** **18 Claims**

1. Sugar ureide and thioureide derivatives of the formula:



wherein $R_1$ represents glucopyranosyl, arabinopyranosyl or gluconyl whose alcoholic hydroxyl groups have been protected by HO-protecting groups; α-(3-carboxy-2,2-dimethylpenam-6-yl-aminocarbonyl)benzyl, α-(4-carboxy-3-methyl-3-cephem-7-yl-aminocarbonyl)benzyl, 2-pyridyl, 2-benzimidazolyl, 2-benzothiazolyl, 6-(1,3-dimethyl-2,4-dioxo)-pyrimidinyl, 5-(4-carbamoyl-1-phenyl)pyrazolyl, 5-(4-ethoxycarbonyl-1-phenyl)pyrazolyl, 4-(2,3-dimethyl-5-oxo-1-phenyl)pyrazolinyl, 6-penicillanyl, 6-(3-phenacyl)penicillanyl, isonicotinoylamino, p-[N-3,4-dimethyl)-5-isoxazolyl]sulfamoylphenyl, p-[N-(2,6--dimethyl)-4-pyrimidinyl]sulfamoylphenyl, p-(N-2-pyrimidinyl)-sulfamoylphenyl or p-(N-2-thiazolyl)sulfamoylphenyl; and Y represents an atom of oxygen or sulfur.

12. A pharmaceutical composition comprising an effective amount of a sugar ureide or thioureide derivative as claimed in claim 1 in association with a pharmaceutical carrier or diluent.

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**4,025,623**

## 4'-EPI-6'-HYDROXYADRIAMYCIN AND METHOD OF USE

**Federico Arcamone, Nerviano (Milan); Alberto Bargiotti, Milan; Giuseppe Cassinelli, Voghera (Pavia), and Aurelio diMarco, Milan, all of Italy, assignors to Societa' Farmaceutici Italia S.p.A., Milan, Italy**

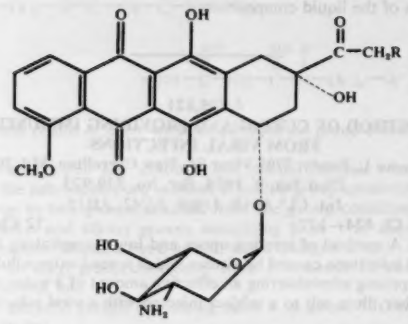
**Filed Oct. 10, 1975, Ser. No. 621,582**

**Claims priority, application United Kingdom, Oct. 29, 1974, 46644/74**

**Int. Cl.² A61K** *31/71*

**U.S. Cl. 424—180** **10 Claims**

1. A compound of the formula



wherein R is H, OH or Br and, in the case where R is H or OH, the hydrochloride salts thereof.

**10.** A method of inhibiting the growth of a tumor selected from the group consisting of Sacroma 180 Ascites and $L_{1210}$ leukemia which comprises intraperitoneally administering to a host afflicted with said tumor an amount of a compound selected from the group consisting of 4'-epi-6'-hydroxydaunomycin and 4'-epi-6'-hydroxyadriamycin sufficient to inhibit the growth of said tumor.

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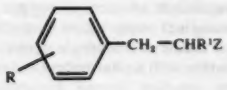
**4,025,624**

## PHENYLALKYLAMINES AND PHENYLALKYLUREAS IN COMBINATIONS TO SUPPRESS GASTRIC BLEEDING IN ASPIRIN THERAPY

**Reevis Stancil Alphin, and William John Welstead, Jr., both of Richmond, Va., assignors to A. H. Robins Company, Incorporated, Richmond, Va.**

**Filed Nov. 18, 1975, Ser. No. 633,042**
**Int. Cl.² A61K** *31/17, 31/615, 31/625*
**U.S. Cl. 424—233** **14 Claims**

**1.** The method of treating inflammatory conditions in mammals which comprises administering to said mammals an effective amount of aspirin and a phenylalkylurea having the formula:



wherein;

Z is selected from the group consisting of

R is selected from the group consisting of hydrogen, chlorine, bromine, fluorine, lower-alkoxy and trifluoromethyl,

$R^1$, $R^2$, $R^3$ and $R^4$ are selected from the group consisting of hydrogen and lower-alkyl.

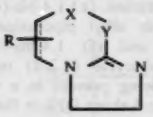
**4,025,625**

## IMIDAZOTHIAZINES

**Clarence S. Rooney, Beaconsfield; Joshua Rokach, Laval, both of Canada, and Edward J. Cragoe, Jr., Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.**

**Filed June 15, 1976, Ser. No. 696,259**
**Int. Cl.² C07D** *279/08, 279/14;* **A61K** *31/54*
**U.S. Cl. 424—246** **9 Claims**

**1.** A compound of structural formula:



or pharmaceutically acceptable salt thereof, wherein the dotted line represents saturation or unsaturation;

—X—Y— represents $-CH_2-S-$ or $-S-CH_2-$; and

R represents $C_{1-2}$ alkyl,

with the proviso that if X-Y represents —S—$CH_2$—, the dotted line represents unsaturation.

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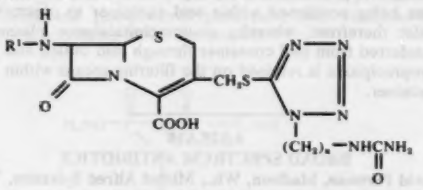
**4,025,626**

## 7-ACYL-3-(UREIDOALKYL SUBSTITUTED TETRAZOLYLTHIOMETHYL)-CEPHALOSPORINS

**David A. Berges, Wayne, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.**

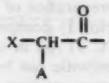
**Filed Dec. 9, 1975, Ser. No. 639,033**
**Int. Cl.² C07D** *501/54;* **A61K** *31/545*
**U.S. Cl. 424—246** **18 Claims**

**1.** A compound of the formula:



in which:

$R^1$ is an acyl group of the formula:



where:

X is thienyl, dihydrophenyl, phenyl or phenyl monosubstituted with hydroxy, hydroxymethyl, formamido, ureido or carboxymethylamino;

A is $NH_2$, OH, COOH or $SO_3H$; or formyloxy when X is phenyl; and

*n* is two to five,

or a non-toxic pharmaceutically acceptable salt thereof.

**13.** A pharmaceutical composition comprising an anti-bacterially effective but nontoxic amount of a compound as claimed in claim 1 and a pharmaceutically acceptable carrier therefor.

**15.** A method of treating bacterial infections comprising administering internally by injection to an infected or susceptible warm-blooded animal an antibacterially effective but nontoxic dose of a compound as claimed in claim 1.

4,025,627

## MICROBIOCIDAL POLYMERIC QUATERNARY AMMONIUM COMPOUNDS

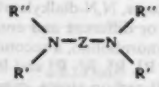
Harold A. Green, Havertown, Pa.; John J. Merianos, Jersey City, and Alfonso N. Petrocci, Glen Rock, both of N.J., assignors to Millmaster Onyx Corporation, New York, N.Y.

Division of Ser. No. 478,524, June 12, 1974, which is a continuation-in-part of Ser. No. 425,931, Dec. 18, 1973, Pat. No. 3,874,870. This application Apr. 7, 1975, Ser. No. 565,839

Int. Cl.² A01N 9/22

U.S. Cl. 424—248.4 3 Claims

1. A method of controlling the proliferation of bacteria which comprises applying to said bacteria an effective amount to inhibit said bacteria of a product formed by the condensation of 1,4-di-halo-2-butene and a difunctional tertiary amine, said difunctional tertiary amine being selected from the group consisting of di-lower-alkyl piperazine, 1,4-diazabicyclo (2.2.2) octane, and an amine of the formula:



wherein Z is a divalent aliphatic radical of 2 to 10 carbon atoms containing from 0 to 2 double bonds and from 0 to 2 hydroxy substituents and wherein R′ and R″ are part of a heterocyclic group when combined with N, said heterocyclic group being selected from the group consisting of N-piperidino, N-pyrrolidino, N-morpholino and N-homopiperidino.

4,025,628

## CONTROL OF BOVINE MASTITIS

Lloyd G. Dewey, Roseville, and James J. Jezeski, New Brighton, both of Minn., assignors to H. B. Fuller Company, St. Paul, Minn.

Filed Sept. 22, 1975, Ser. No. 615,282

Int. Cl.² A61K 31/53

U.S. Cl. 424—249 9 Claims

1. A method for controlling bovine mastitis comprising immersing the teats of a cow in a teat dip comprising an aqueous dispersion of titratable chlorine produced by mixing with water a powdered, water-dispersible formulation containing an amount of chlorinated cyanurate sufficient to yield about 3,000 to 7,000 ppm titratable chlorine and a slighly acid to neutral or nearly neutral pH.

6. A powdered, water-dispersible, effervescent formulation consisting essentially of 18 to 36 weight percent powdered sodium dichloroisocyanurate, 5 to 40 weight percent sodium sulfate, 0.5 to 2 weight percent liquid chlorinated paraffin with a chlorine content of about 40 weight percent, 5 to 15 weight percent polyvinylpyrrolidone, and 5 to 15 weight percent sorbitol, and 30 to 50 weight pecent of a mixture of 75 to 85 weight percent monobasic sodium phosphate and 15 to 25 weight percent of sodium bicarbonate, 30 grams of said formulation dispersing rapidly in one liter of water at 22° C with vigorous shaking in 30 seconds or less to produce an aqueous dispersion containing about 5,000 ppm titratable chlorine and having a pH of 6.0 to 6.2.

4,025,629

## P-(TRIFLUOROMETHYLQUINOLYLAMINO)BENZAMIDES, PHARMACEUTICAL DOSAGE FORMS AND METHOD OF TREATMENT

Charles E. Coverdale, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 431,252, Jan. 7, 1974, abandoned, which is a continuation of Ser. No. 227,608, Feb. 18, 1972, abandoned, which is a continuation-in-part of Ser. No. 848,739, Aug. 8, 1969, abandoned. This application Mar. 21, 1975, Ser. No. 560,918

Int. Cl.² A61K 31/47; C07D 215/44

U.S. Cl. 424—250 6 Claims

1. p-[(7-trifluoromethyl-4-quinolyl)amino]-N,N-(3-methyl-3-azapentamethylene)benzamide.

2. 1-[p-[[(7-trifluoromethyl)-4-quinolyl]-amino]-benzoyl]-piperazine dihydrochloride.

4,025,630

## ANESTHESIA METHODS USING BENZOPYRANS AND ESTERS THEREOF AS PRE-ANESTHESIA MEDICATION

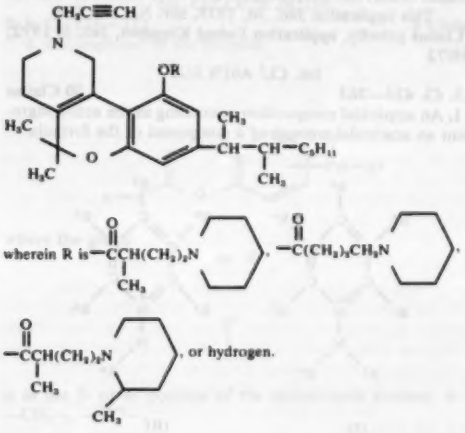
Anthony Thomas Dren, Waukegan, and Donn Myron Ebert, Lake Zurich, both of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Division of Ser. No. 398,616, Sept. 19, 1973. This application Sept. 11, 1974, Ser. No. 505,125

Int. Cl.² A61K 31/435

U.S. Cl. 424—256 7 Claims

1. A method of pretreating a patient which is to be anesthetized with an anesthetic halothane, said method comprising administering to said patient from 0–120 minutes prior to the administration of said anesthetic halothane, a dose of from 1 to 5 mg./kg. body weight of a benzopyran of the formula



4,025,631

## DIHYDROQUINOLINE DERIVATIVES OF ANTIOXIDANT ACTIVITY

Vilmos Bär; Jenő Mercz; János Szvoboda; Zsuszanna B. Polák, and Jakab Mátyás, all of Budapest, Hungary, assignors to Material Ksz., Budapest, Hungary

Division of Ser. No. 285,168, Aug. 31, 1972, abandoned. This application Jan. 2, 1975, Ser. No. 538,294

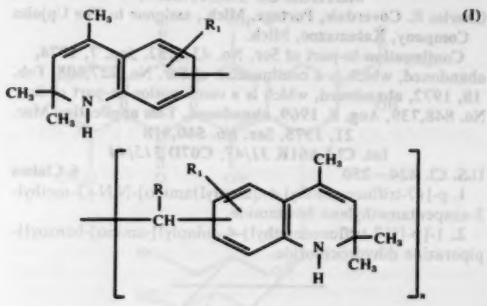
Claims priority, application Hungary, Sept. 7, 1971, 2642

Int. Cl.² A61K 31/47

U.S. Cl. 424—258 6 Claims

1. A pharmaceutical product of antioxidant activity, usable in combination with radiation for the treatment of malignant

processes, characterized by containing an effective amount of at least one compound of the formula (I)



(I)

wherein

R represents hydrogen or a lower alkyl group of 1 to 4 carbon atoms,

$R_1$ represents hydrogen or a methyl group which may be attached to a carbon atom in any of the free positions to the ring system, with the exception of position 6, and

*n* is 1, 2 or 3 or a pharmaceutically acceptable acid addition salt thereof in combination with a pharmaceutically acceptable carrier.

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**4,025,632**

## ACARICIDAL PYRIDINIUM SALTS

**John Henry Parsons, Saffron Walden, England, assignor to Fisons Limited, London, England**

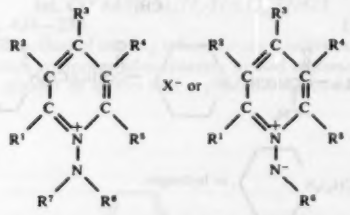
**Division of Ser. No. 321,476, Jan. 5, 1973, Pat. No. 3,886,171. This application Jan. 30, 1975, Ser. No. 545,700**

**Claims priority, application United Kingdom, Jan. 5, 1972, 369/72**

**Int. Cl.[2] A01N 9/22**

**U.S. Cl. 424—263** **30 Claims**

1. An acaricidal composition containing as the active ingredient an acaricidal amount of a compound of the formula



(I) (II)

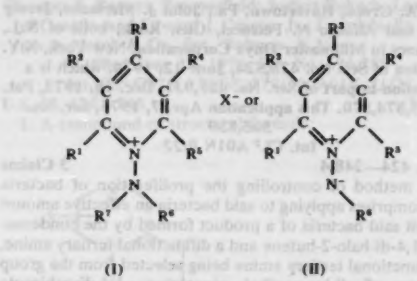
in which $R^1$, $R^2$, $R^3$, $R^4$ and $R^5$ are the same or different and each represents hydrogen or alkyl of 1 to 4 carbon atoms;

$R^6$ represents a group of formula $COR^{10}$ in which $R^{10}$ represents phenyl substituted by one or more groups selected from halogen, alkyl of 1 to 4 carbon atoms, nitro and alkoxy of 1 to 4 carbon atoms; phenylalkyl of 7 to 10 carbon atoms; phenylalkyl of 7 to 10 carbon atoms substituted by halogen; cycloalkyl of 3 to 8 carbon atoms;

$R^7$ represents hydrogen, alkyl of 1 to 4 carbon atoms or benzyl substituted by halogen; and

$X^-$ represents one equivalent of an acaracidally effective anion and a carrier therefor.

7. A method of combating acarids at a locus, which comprises applying to the locus an acarid-combating amount of a compound of the formula



(I) (II)

in which $R^1$, $R^2$, $R^3$, $R^4$ and $R^5$ are the same or different and each represents hydrogen, halogen, nitro, alkyl of 1 to 4 carbon atoms, alkyl of 1 to 4 carbon atoms substituted by hydroxy or halogen, alkoxy of 1 to 4 carbon atoms, carboxy, alkoxycarbonyl whose alkoxy group contains 1 to 4 carbon atoms, carbamoyl, N-alkylcarbamoyl whose alkyl group contains 1 to 4 carbon atoms, N,N-dialkylcarbamoyl whose alkyl groups are the same or different and contain 1 to 4 carbon atoms, phenyl; furyl, morpholino, a second group of formula I or II in which one of $R^1$, $R^2$, $R^3$, $R^4$ and $R^5$ is merely a bond, phenylalkyl of 7 to 10 carbon atoms, cyano or hydroxy, with the proviso that $R^3$ does not represent a second group of formula I or II in which $R^3$ is merely a bond;

$R^6$ represents a group of formula $COR^8$, $COOR^8$, $CONR^8R^9$ or $SO_2R^8$, in which $R^8$ represents alkyl of 1 to 8 carbon atoms; alkyl of 1 to 8 carbon atoms substituted by halogen, alkoxycarbonyl of 2 to 5 carbon atoms, alkoxy of 1 to 4 carbon atoms, or by phenoxy substituted by halogen, alkyl of 1 to 4 carbon atoms or halogen and alkyl of 1 to 4 carbon atoms; phenyl; naphthyl; phenyl or naphthyl substituted by one or more groups selected from halogen, alkyl of 1 to 4 carbon atoms, nitro or alkoxy of 1 to 4 carbon atoms; phenylalkyl of 7 to 10 carbon atoms; phenylalkyl of 7 to 10 carbon atoms substituted by halogen; styryl; styryl substituted by halogen; cycloalkyl of 3 to 8 carbon atoms; furyl; thienyl; benzofuryl; or pyridyl; and $R^9$ represents hydrogen; alkyl of 1 to 8 carbon atoms; alkyl of 1 to 8 carbon atoms substituted by halogen or alkoxy of 1 to 4 carbon atoms; phenyl; or phenyl substituted by halogen or alkyl of 1 to 4 carbon atoms;

$R^7$ represents hydrogen, alkyl of 1 to 4 carbon atoms or a group as defined under $R^6$; and

$X^-$ represents one equivalent of an anion.

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**4,025,633**

## α,α-DIARYL-β-(TERT-AMINO)-PROPANOLS AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

**Wilhelm A. Behrendt, Niederweimar, Kreis Marburg, and Bernhard Stieh, Marburg, both of Germany, assignors to Firma Temmler A.G., Basel, Switzerland**

**Filed Mar. 3, 1975, Ser. No. 554,902**

**Claims priority, application Germany, Mar. 4, 1974, 2410284**

**Int. Cl.[2] C07D 405/06**

**U.S. Cl. 424—267** **4 Claims**

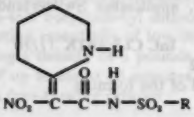
1. A pharmaceutical composition wherein the active ingredient is 1-(7′, 8′-Dimethylchromanyl-(6′))-1-phenyl-2-piperidino-propan-1-ol, together with a pharmaceutically acceptable diluent or carrier.

## 4,025,634
## N-(ARYLSULFONYL)-ALPHA-NITRO-DELTA 2,alpha-PIPERIDINEACETAMIDES

George Bernson Payne, Modesto, Calif., assignor to Shell Oil Company, Houston, Tex.

Filed Mar. 1, 1976, Ser. No. 662,627
Int. Cl.² C07D 211/70; A01N 9/16
U.S. Cl. 424—267 4 Claims

1. A compound of the formula:



wherein R is phenyl or phenyl substituted by from one to two of one of halogen, nitro, cyano, alkyl or alkoxy of from one to six carbon atoms or phenoxy.

2. An insecticidal composition comprising a compound according to claim 1, together with an adjuvant therefor.

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## 4,025,635
## CYCLIC SULPHUR COMPOUNDS

Harold Francis Hodson, Hayes, and John Frederick Batchelor, Beckenham, both of England, assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Filed Sept. 5, 1973, Ser. No. 394,424
Claims priority, application United Kingdom, May 4, 1973, 21174/73; Sept. 6, 1972, 41429/72
Int. Cl.² C07D 257/04; A61K 31/41
U.S. Cl. 424—269 17 Claims

1. The method of preventing the symptoms of an allergic condition of a mammal having an allergic condition which comprises administering to said mammal a prophylactically effective amount of a tricyclic compound:

2-(5-tetrazolyl)phenoxathiin-10,10-dioxide; or a pharmaceutically acceptable salt thereof, said allergic condition being selected from the group consisting of asthma, allergic rhinitis, conjunctivitis, urticaria and eczema.

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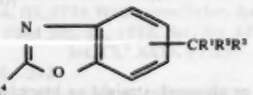
## 4,025,636
## 2-(OPTIONALLY SUBSTITUTED)PHENYL-5 OR 6-SUBSTITUTED BENZOXAZOLES

David William Dunwell, Camberley; Delme Evans, Peter, and Terence Alan Hicks, Farnborough, all of England, assignors to Lilly Industries, Ltd., London, England

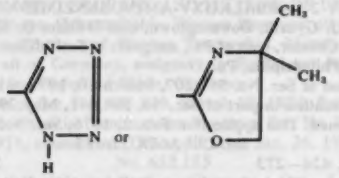
Continuation-in-part of Ser. No. 515,132, Oct. 16, 1974, abandoned. This application Feb. 4, 1976, Ser. No. 655,669
Claims priority, application United Kingdom, Oct. 23, 1973, 49258/73
Int. Cl.² C07D 263/56
U.S. Cl. 424—269 4 Claims

1. A benzoxazole of the formula:



I

wherein the group —$CR^1R^2R^3$ is in the 5- or 6-position of the benzoxazole nucleus, $R^4$ is phenyl, methylphenyl, methoxyphenyl, chlorophenyl, fluorophenyl, or dichlorophenyl; $R^3$ is one of the groups:



and $R^1$ and $R^2$ are independently hydrogen or methyl; or $R^3$ is carboxy or methyl or ethyl ester thereof, $R^1$ is hydrogen, chloro, bromo, or methyl, and $R^2$ is chloro, bromo, hydroxy, methoxy, or acetoxy.

4. A pharmaceutical formulation comprising a chemotherapeutically effective amount of a pharmaceutically active compound of formula I as defined in claim 1 in association with at least one pharmaceutically acceptable carrier therefor.

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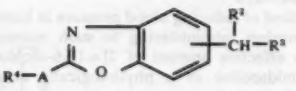
## 4,025,637
## 2,5 OR 2,6 DISUBSTITUTED BENZOXAZOLES

David William Dunwell, Camberly; Delme Evans, Chalfont St. Peter, and Terence Alan Hicks, Farnborough, all of England, assignors to Lilly Industries, Ltd., London, England

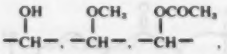
Continuation-in-part of Ser. No. 515,133, Oct. 16, 1974, abandoned. This application Feb. 4, 1976, Ser. No. 655,668
Claims priority, application United Kingdom, Oct. 23, 1973, 49260/73
Int. Cl.² C07D 263/56
U.S. Cl. 424—272 6 Claims

1. A compound of the formula:



where the group

is in the 5- or 6- position of the benzoxazole nucleus, A is —$CH_2$—, —CO—,



—NH— or —$NCH_3$—, $R^4$ is a phenyl group optionally substituted by one or two groups selected from halogen, trifluoromethyl, methyl, or methoxy, $R^2$ is hydrogen or methyl, and $R^3$ is the group $COOR^5$ wherein $R^5$ is $C_{1-4}$ alkyl or the group COOH or an alkali or alkaline earth metal, aluminum, or ammonium salt thereof.

6. A method of treating a human suffering from arthritis which comprises the administration of a chemotherapeutically effective amount of an active compound of formula (I) as defined in claim 1.

## 4,025,638
## METHODS AND COMPOSITIONS USING 5-CYCLOALKYLTHIO- AND OXY-2-CARBALKOXY-AMINOBENZIMIDAZOLE

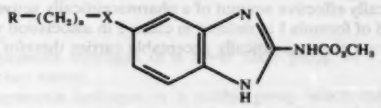
**Robert J. Gyurik, Downingtown, and William D. Kingsbury, West Chester, both of Pa., assignors to SmithKline Corporation, Philadelphia, Pa.**

**Division of Ser. No. 557,207, March 10, 1975, which is a continuation-in-part of Ser. No. 364,841, May 29, 1973, abandoned. This application Feb. 2, 1976, Ser. No. 654,269**

**Int. Cl.² A61K *31/415***

**U.S. Cl. 424—273** **11 Claims**

1. The method of producing anthelmintic activity in warm blooded animals susceptible to helminthic infections comprising administering orally to said animals an anthelmintically effective but nontoxic quantity of a chemical compound of the structure:



in which R is cycloalkyl of 3–6 carbons, n is an integer of from 0–5 and X is oxy or thio, $R(CH_2)_n$ having 3–8 carbons.

## 4,025,639
## BLOOD PRESSURE LOWERING IN HUMAN MAMMALS

**Horst Baganz, Moorrege, and Hans-Joachim May, Neustadt-Hambach an der Weinstrasse, both of Germany, assignors to A. Nattermann & Cie GmbH, Germany**

**Division of Ser. No. 566,136, April 8, 1975, Pat. No. 3,966,757, which is a continuation-in-part of Ser. No. 440,345, Feb. 7, 1974, abandoned, which is a continuation of Ser. No. 164,815, July 21, 1971, abandoned, which is a continuation of Ser. No. 706,665, Feb. 19, 1968, abandoned. This application Dec. 5, 1975, Ser. No. 638,046**

**Claims priority, application Germany, Feb. 23, 1967, 30055**

**Int. Cl.² A61K *31/415***

**U.S. Cl. 424—273** **4 Claims**

1. A method of reducing blood pressure in human mammals which comprises administering to such mammals in need thereof an effective amount of 2[α-(2,6-dichlorophenoxy)-ethyl]-$\Delta^2$-imidazoline or a physiologically acceptable acid addition salt thereof.

## 4,025,640
## OXOTHIENOBENZOXEPIN-ACETIC ACIDS, PRECURSORS AND DERIVATIVES THEREOF

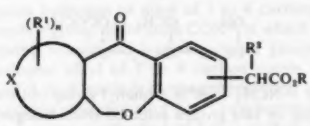
**Arthur Raymond McFadden, East Brunswick, and Daniel Eugene Aultz, Middlesex, both of N.J., assignors to American Hoechst Corporation, Bridgewater, N.J.**

**Filed Aug. 26, 1975, Ser. No. 607,926**

**Int. Cl.² A61K *31/38*; C07D *497/02***

**U.S. Cl. 424—275** **15 Claims**

1. A compound of the formula



wherein X together with the carbon atoms to which it is attached is a thieno ring structure; R is hydrogen or straight or branched chain alkyl of from 1 to 5 carbon atoms; $R^1$ is hydrogen or alkyl of 1 to 4 carbon atoms; $R^2$ is hydrogen or methyl; n is the integer 1, 2 or 3; and salts thereof prepared from pharmaceutically acceptable bases.

10. A method of treating inflammation which comprises administering to a patient an effective amount of a compound defined in claim 1.

## 4,025,641
## POLYETHER SUBSTITUTED 3,4-METHYLENEDIOXYBENZENES

**Fritz Schaub, Basel, and Hans-Peter Schelling, Oberwil, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland**

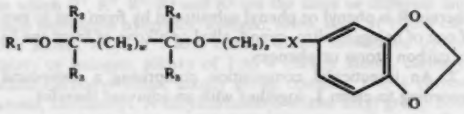
**Continuation of Ser. No. 370,763, June 18, 1973, abandoned. This application May 5, 1975, Ser. No. 574,438**

**Claims priority, application Switzerland, June 23, 1972, 9520/72**

**Int. Cl.² A61K *31/36***

**U.S. Cl. 424—282** **13 Claims**

1. A compound of the formula



wherein

$R_1$ is alkyl of 1 to 9 carbon atoms, alkenyl of 3 to 9 carbon atoms, alkynyl of 3 to 9 carbon atoms, cycloalkyl of 5 to 7 carbon atoms or cycloalkyl of 5 to 7 carbon atoms substituted by alkyl of 1 to 4 carbon atoms,

$R_2$, $R_3$, $R_4$ and $R_5$ are independently hydrogen or alkyl of 1 to 4 carbon atoms,

*w* is 2 to 4,

*z* is 4 or 6, and

X is oxygen, sulfur, $—OCH_2—$ or $—SCH_2—$.

11. An insecticidal or acaricidal composition which comprises an insecticidal or acaricidal effective amount of a compound of claim 1 in association with an insecticide or acaricide carrier or diluent.

13. A method of combating insects or acarids in a locus, which comprises applying to the locus an insecticidally or acaricidally effective amount of a compound of claim 1.

## 4,025,642
## SUBSTITUTED 2H-PYRAN-2, 6(3H)-DIONE DERIVATIVES

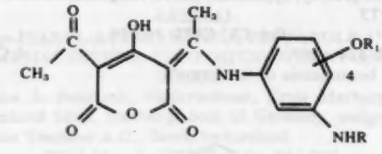
**Kenneth M. Snader, Hatboro, Pa., and Chester R. Willis, Kingston, Jamaica, assignors to SmithKline Corporation, Philadelphia, Pa.**

**Filed Dec. 3, 1975, Ser. No. 637,428**

**Int. Cl.² A61K *31/35*; C07D *309/20***

**U.S. Cl. 424—283** **24 Claims**

1. A compound represented by the formula:



wherein:

R is hydrogen or alkanoyl, straight or branched chain, of from 2 to 5 carbon atoms; and

$R_1$ is hydrogen or lower alkyl of from 1 to 4 carbon atoms, a mono- or di-alkali metal salt of said compound or a pharmaceutically acceptable acid addition salt of said compound when R is hydrogen.

4,025,643

## RODENT REPELLENT POWDERS AND PREPARATION THEREOF

Paul F. Warner, Phillips, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 23, 1975, Ser. No. 543,638
Int. Cl.² A01N 9/12; A01N 9/20
U.S. Cl. 424—300 9 Claims

1. A method for preparing a free-flowing, rodent repellent powder composition comprising grinding crystals of a rodent repellent effective N,N-dialkyl-sulfenyl dithiocarbamate selected from N,N-dimethyl-S-methylsulfenyl dithiocarbamate or N,N-dimethyl-S-tert butylsulfenyl dithiocarbamate with a grinding aid consisting essentially of low-density clay or low-density silica having a density of 5 pounds per cubic foot or less for a period of up to about 15 minutes, said period sufficient to produce a free-flowing powder.

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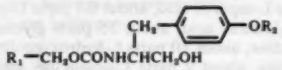
4,025,644

## TYROSINE DERIVATIVES AND USE

Tosaku Miki; Yasuhiro Hosokawa; Tamotsu Miwa; Hiroshi Fujita; Masahide Asano, and Shunzo Aibara, all of Tokyo, Japan, assignors to Daiichi Seiyaku Co., Ltd., Tokyo, Japan

Filed Dec. 9, 1975, Ser. No. 639,117
Claims priority, application Japan, Dec. 18, 1974, 49-145133; Dec. 18, 1974, 49-145134; Apr. 2, 1975, 50-39959; Apr. 4, 1975, 50-41000
Int. Cl.² C07C 125/06
U.S. Cl. 424—300 5 Claims

1. A compound of the formula



wherein $R_1$ is cyclopentyl, cyclohexyl, cycloheptyl or phenyl, wherein the phenyl may have one or more substituents selected from the group consisting of lower alkyl, lower alkoxy, halogen, amino, nitro and combinations thereof; $R_2$ is hydrogen or lower alkyl; and when $R_1$ is unsubstituted phenyl, $R_2$ is lower alkyl.

5. The method of treating ulcers in humans which comprises administering a compound of claim 1 in an amount effective for treating said ulcers.

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4,025,645

## NON-STEROID TOPICAL AGENT FOR ALLEVIATING INFLAMMATION IN MAMMALS

Carl Jelenko, III, 2716 Wellington Drive, Augusta, Ga. 30904

Filed Jan. 27, 1976, Ser. No. 652,670
Int. Cl.² A61K 31/23
U.S. Cl. 424—312 13 Claims

1. A method of treating an inflammatory response invoked by a chemical selected from one member of a group consisting of histamine, serotonin, and a prostaglandin in mammals which comprises topically applying to body surfaces of said mammals an inflammation-alleviating amount of ethyl-cis,cis (9,12)-octadecadienoate.

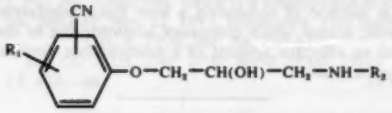
4,025,646

## PHARMACEUTICAL COMPOSITIONS CONTAINING A 1-(CYANO-PHENOXY)-2-HYDROXY-3-HYDROXYALKYLAMINO-PROPANE AND METHOD OF USE

Herbert Köppe; Helmut Stähle; Werner Kummer, all of Ingelheim am Rhein, and Werner Traunecker, Munster-Sarmsheim, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Division of Ser. No. 451,820, March 18, 1974, Pat. No. 3,959,338, which is a continuation-in-part of Ser. No. 185,897, Oct. 1, 1971, abandoned. This application Jan. 26, 1976, Ser. No. 652,113
Claims priority, application Germany, Oct. 5, 1970, 2048838
Int. Cl.² A61K 31/275
U.S. Cl. 424—304 10 Claims

1. A pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective β-adrenolytic or hypotensive amount of a racemic or optically active compound of the formula

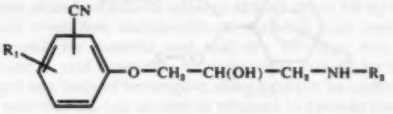


wherein $R_1$ is a hydrogen, chlorine, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms, and

$R_2$ is straight or branched monohydroxyalkyl of 3 to 4 carbon atoms,

or a non-toxic, pharmacologically acceptable acid addition salt thereof.

6. The method of blocking the β-adrenergic receptors or lowering the blood pressure in a warm-blooded animal in need of such treatment, which comprises administering to said animal an effective β-adrenolytic amount of a racemic or optically active compound of the formula



wherein $R_1$ is hydrogen, chlorine, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms, and

$R_2$ is straight or branched monohydroxyalkyl of 3 to 4 carbon atoms,

or a non-toxic, pharmacologically acceptable acid addition salt thereof.

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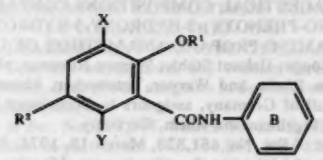
4,025,647

## SALICYLANILIDE DERIVATIVES HAVING ANTHELMINTIC ACTIVITY

Murdoch Allan Eakin, and Justus Kenneth Landquist, both of Macclesfield, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Sept. 15, 1975, Ser. No. 613,559
Claims priority, application United Kingdom, Sept. 20, 1974, 41053/74
Int. Cl.² A61K 31/275; C07C 121/80
U.S. Cl. 424—304 7 Claims

1. A salicylanilide derivative having the formula:-



wherein $R^1$ is hydrogen; $R^2$ is a cyano radical; X is a tertiary butyl radical; Y is a methyl radical; and ring B forms a phenyl radical bearing a halogen atom or a trifluoromethyl radical at the 2-position and a nitro or cyano radical at the 4-position; or ring B forms a phenyl radical bearing in either the 3- or 4-positions or the 3,4- and 5-positions, substituents selected from halogen atoms, cyano, nitro and trifluoromethyl radicals, alkyl radicals of from 1 to 4 carbon atoms, and phenoxy, phenylthio phenylsulphonyl, and benzoyl radicals each optionally bearing one or two substituents selected from halogen atoms and cyano and nitro radicals, provided that at least one of the substituents borne by ring B is a cyano radical or a halogen atom; or a base-addition salt thereof.

7. A method of combating a liver fluke infestation in a domestic animal which comprises administering to the said animal an effective amount of a salicylanilide derivative as claimed in claim 1.

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**4,025,648**

## HALOACYLANILIDES AND USE AS FUNGICIDES

**Adolf Hubele, Magden, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

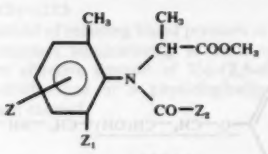
**Filed Mar. 27, 1975, Ser. No. 562,721**

**Claims priority, application Switzerland, Apr. 1, 1974, 4509/74; Feb. 13, 1975, 1785/75**

**Int. Cl.² C07C** *103/46*

**U.S. Cl. 424—309** **23 Claims**

1. A haloacylanilide of the formula I



(I)

wherein Z represents hydrogen or methyl, $Z_1$ represents methyl or ethyl and $Z_2$ represents an alkyl group of 2 to 4 carbon atoms which is substituted by a chlorine, bromine or iodine atom.

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**4,025,649**

## ACETIC ACID DERIVATIVES HAVING PHARMACOLOGICAL ACTIVITY AND COMPOSITIONS CONTAINING THE SAME

**Georges Marcel Taillandier; Jean-Louis Alain Benoit-Guyod, both of Grenoble; Andre Louis Boucherle, Corenc-Montfleury; Pierre Luc Eymard, Fontaine; Madeleine Broll, Grenoble, and Bernard Ferrandes, Claix, all of France, assignors to Labaz, Paris, France**

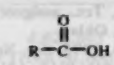
**Filed June 18, 1975, Ser. No. 588,001**

**Claims priority, application France, June 26, 1975, 75.28416**

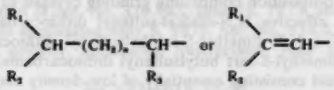
**Int. Cl.² A61K** *31/19, 31/20*

**U.S. Cl. 424—318** **13 Claims**

1. A pharmaceutical or veterinary composition having a competitive inhibitory activity with respect to γ-aminobutyric α-ketoglutaric transaminase and antianoxic and anticonvulsant action comprising as an essential active ingredient at least one acetic acid derivative of the general formula:



wherein R is



in which $R_1$ and $R_2$, which may be the same or different, each represent an alkyl radical having from 1 to 4 carbon atoms, $R_3$ represents a hydrogen atom or a methyl radical and $n$ is an integer in the range of from 0 to 3 inclusive, or a pharmaceutically acceptable alkali metal salt of the said derivative, in association with a pharmaceutical carrier or excipient therefor, in dosage unit form containing from 100 to 1000 milligrams of active ingredient per unit.

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**4,025,650**

## METHOD AND COMPOSITION FOR PREVENTING NUTRITIONAL DEFICIENCY

**Arnold M. Gans, Closter; Alvin J. Goren, North Bergen, and Eli M. Gorenberg, Fair Lawn, all of N.J., assignors to Control Drug, Inc., Port Reading, N.J.**

**Filed Nov. 24, 1975, Ser. No. 634,857**

**Int. Cl.² A61K** *31/195*

**U.S. Cl. 424—319** **3 Claims**

1. A nutritional composition comprising about 5 to about 75 parts by weight of hydrolyzed gelatin, about 0.02 to about 0.75 parts by weight of trytophane, about 0.1 to about 2 parts by weight of a sweetener, and about 5 to about 100 parts by weight of an ingestible carrier, said nutritional composition containing essentially the following amino acids in parts by weight: about 13 parts L-alanine, about 12 parts L-arginine, about 9 parts L-aspartic acid, about 0.1 parts L-cystine, about 15 parts L-glutamic acid, about 35 parts glycine, about 1.1 parts L-histidine, about 10 parts L-hydroxyproline, about 4.5 parts L-leucine, about 2 parts L-isoleucine, about 6.5 parts L-lysine, about 1.5 parts hydroxylysine, about 1.1 parts L-methionine, about 3.5 parts L-phenylalanine, about 23 parts L-proline, about 10 parts L-serine, about 3 parts L-threonine, about 0.65 parts L-tryptophane, about 1 part L-tyrosine, and about 3.5 parts L-valine.

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**4,025,651**

## N-SUBSTITUTED-AMINOACETAMIDES USED AS FUNGICIDES

**Osamu Kirino; Tadashi Ooishi; Nobuyuki Kameda, all of Takarazuka; Toshiro Kato, Amagasaki; Toshiaki Ozaki, Toyonaka, and Akira Fujinami, Ashiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

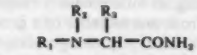
**Filed Mar. 14, 1975, Ser. No. 558,604**

**Claims priority, application Japan, Mar. 14, 1974, 49-29731**

**Int. Cl.² A01N** *9/20*

**U.S. Cl. 424—320** **8 Claims**

1. A method for preventing soil-borne fungal diseases of plants which comprises contacting the fungi with a fungicidally effective amount of at least one aminoacetamide compound of the formula



(I)

wherein $R_1$ represents a lower alkenyl group having up to 5 carbon atoms, a halogen-substituted lower alkenyl group

having up to 5 carbon atoms or a lower alkynyl group having up to 5 carbon atoms, $R_2$ and $R_3$, which may be the same or different, each represents a hydrogen atom or a lower alkyl group having up to 4 carbon atoms, and an acid addition salt thereof as an active ingredient.

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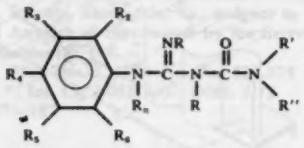
4,025,652

## AMIDINOUREAS

**Julius Diamond, Morris Plains, N.J., and George H. Douglas, Paoli, Pa., assignors to William H. Rorer, Inc., Fort Washington, Pa.**

**Filed Mar. 31, 1975, Ser. No. 558,186**
**Int. Cl.² A61K *31/17***
**U.S. Cl. 424—322** **36 Claims**

1. A method for the treatment of diarrhea in humans and mammals which comprises the administering thereto between 0.01 to 500 mg/kg per day of a compound of the formula:



where:

$R_2$, $R_3$, $R_4$, $R_5$ and $R_6$ may be the same or different and are:
hydrogen,
halo,
loweralkyl,
halologeralkyl,
nitro,
loweralkoxy,
hydroxy,
arloweralkoxy,
halologeralkoxy or
loweralkylsulfonyl;
R and $R_n$ are hydrogen or loweralkyl;
R′ and R″ are hydrogen,
alkyl,
cycloalkyl or
aralkyl; and the non-toxic acid addition salts thereof.

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4,025,653

## MICROBIOCIDAL POLYMERIC QUATERNARY AMMONIUM COMPOUNDS

**Harold A. Green, Havertown, Pa.; John J. Merianos, Jersey City, and Alfonso N. Petrocci, Glen Rock, both of N.J., assignors to Millmaster Onyx Corporation, New York, N.Y.**

**Division of Ser. No. 565,839, April 7, 1975, which is a division of Ser. No. 478,524, June 12, 1974, which is a continuation-in-part of Ser. No. 425,931, Dec. 18, 1973, Pat. No. 3,874,870. This application Nov. 13, 1975, Ser. No. 631,739**
**Int. Cl.² A01N *9/20***
**U.S. Cl. 424—325** **3 Claims**

1. A method of controlling the proliferation of bacteria which comprises applying to said bacteria an effective amount to inhibit said bacteria of a product formed by the condensation of 1,4-di-halo-2-butene and a difunctional tertiary amine, said difunctional tertiary amine being selected from the group consisting of 1,4-bis-(diethanolamino)-2-butene; 1,4-bis-(dipropylamino)-2-butene; 1,4-bis-(dibutylamino)-2-butene; 1,4-bis-(di-2-ethylhexyl-amino)-2-butene; 1,4-bis-(dioctylamino)-2-butene; 1,4-bis-(didecyl-amino)-2-butene; 1,4-bis-(didodecylamino)-2-butene; 1,4-bis-(N-methyl propylamino)-2-butene; 1,4-bis-(N-methylbutylamino)-2-butene; 1,4-bis-(N-methyl hexylamino)-2-butene; 1,4-bis-(N-methyl octylamino)-2-butene; 1,4-bis-(N-methyl decylamino)-2-butene; and 1,4-bis-(N-methyl dodecylamino)-2-butene.

4,025,654

## STABLE CHELOCARDIN COMPOSITION

**Bahram Farhadieh, Libertyville, Ill., assignor to Abbott Laboratories, North Chicago, Ill.**

**Continuation-in-part of Ser. No. 566,596, April 9, 1975, abandoned. This application Dec. 17, 1975, Ser. No. 641,408**
**Int. Cl.² A61K *31/135***
**U.S. Cl. 424—330** **5 Claims**

1. A solid, pharmaceutical antibiotic composition suitable for reconstitution into a parenteral solution consisting essentially of a freeze-dried mixture of monosodium chelocardin and sodium citrate dihydrate in a weight ratio of between 1:0.2 and 1:2.

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4,025,655

## BEVERAGE CARBONATION DEVICES

**David D. Whyte, Wyoming, and Ronald L. Sampson, North College Hill, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Division of Ser. No. 488,594, July 15, 1974, Pat. No. 3,992,493, which is a division of Ser. No. 302,149, Nov. 30, 1972, Pat. No. 3,888,998, which is a continuation-in-part of Ser. No. 200,849, Nov. 22, 1971, abandoned. This application Oct. 4, 1976, Ser. No. 729,617**
**Int. Cl.³ A23L *2/40, 2/00;* B65B *29/06, 29/10***
**U.S. Cl. 426—66** **23 Claims**

1. A beverage carbonation device which comprises a water and gas permeable container, a dry beverage mix, and an amount effective to carbonate a beverage of a porous crystalline aluminosilicate material having absorbed therein an amount of carbon dioxide equal to at least about 5% by weight of said crystalline aluminosilicate material; said crystalline aluminosilicate material and said dry beverage mix being enclosed in said container; whereby when said device is submerged in a body of beverage-making liquid to be carbonated, said adsorbed carbon dioxide is released to provide beverage carbonation.

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4,025,656

## PREVENTING FOOD PRODUCTS FROM ADHERING

**Simon Weil Arenson, Baltimore, Md., assignor to Food Research-Marketers, Inc., Baltimore, Md.**

**Continuation of Ser. No. 572,509, April 28, 1975, Pat. No. 3,940,497, which is a continuation-in-part of Ser. No. 358,315, May 8, 1973, Pat. No. 3,881,029, which is a continuation-in-part of Ser. No. 299,920, Oct. 24, 1972, abandoned. This application Feb. 23, 1976, Ser. No. 660,533 The portion of the term of this patent subsequent to Apr. 29, 1992, has been disclaimed.**
**Int. Cl.² A23B *4/00***
**U.S. Cl. 426—92** **15 Claims**

1. A first food product coated with a hardened fat in powder form in an amount sufficient to prevent adherence of the product to another during freezing or refrigeration in contact with a second food product coated with a hardened fat in powder form in an amount at least sufficient to prevent adherence of the second food product to the first food product, whereby the first and second food products are coated on their mutually contacting surfaces with said hardened fat and

wherein the first and second food products are selected from the group consisting of meat, seafood, and poultry.

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4,025,657

## EXTRUDED STARCH PRODUCT FOR TAPIOCA-STYLE PUDDING

**Hsiung Cheng, and William S. Huebner, both of Decatur, Ill., assignors to A. E. Staley Manufacturing Company, Decatur, Ill.**

**Filed Feb. 24, 1975, Ser. No. 552,579**
**Int. Cl.² A23L** *1/187, 1/195*
**U.S. Cl. 426—579** **30 Claims**

1. An edible starch product comprising uniform spheroidal starch particles obtained by extrusion with no added heat, said starch particles having an average level of gelatinization in the range of at least 45 up to about 70% by weight calculated from enzyme conversion of the solubilized portion of the starch to dextrose, each of said particles being gelatinized within about 7.5% of the same average level of partial gelatinization, as measured from random samples of said starch particles, said starch particles being resistant to disintegration on cooking as an ingredient in mass produced pudding processed in an automated high temperature canning system, but capable of swelling without dissolving under such canning conditions to define distinct, uniform translucent starch pearls having a higher moisture content, and providing said pudding with a distinct tapioca-like appearance, texture and mouthfeel.

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4,025,658

## MILK-LIKE PRODUCTS FROM PEANUTS

**Joseph Pominski, Metairie, and James J. Spadaro, New Orleans, both of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Filed Oct. 30, 1975, Ser. No. 627,325**
**Int. Cl.² A23L** *1/36;* **A23C** *11/00*
**U.S. Cl. 426—598** **1 Claim**

1. A process for preparing milk-like products from raw peanuts comprising:

a. heating raw shelled peanuts to a temperature from about 140° to about 250° F for about 15 to 80 minutes, to a moisture content of about 3–4%;

b. blanching the heated peanuts from (a) to remove the skins;

c. adjusting the moisture content to a range of about 6–9%;

d. grinding the peanuts from (c);

e. mixing the ground peanuts from (d) with water in a ratio of 1:9 by weight respectively;

f. heating the mixture from (e) to a temperature of 212° F for about one minute and then for about 10 minutes at a temperature of about 180° F.

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4,025,659

## SOY PROTEIN/CASEIN COFFEE WHITENER COMPOSITION

**Iue Chung Cho, and Charles W. Kolar, Jr., both of St. Louis, Mo., assignors to Ralston Purina Company, St. Louis, Mo.**

**Continuation-in-part of Ser. No. 584,682, June 6, 1975, abandoned. This application May 24, 1977, Ser. No. 685,882**
**Int. Cl.² A23D** *5/00;* **A23L** *1/19*
**U.S. Cl. 426—613** **10 Claims**

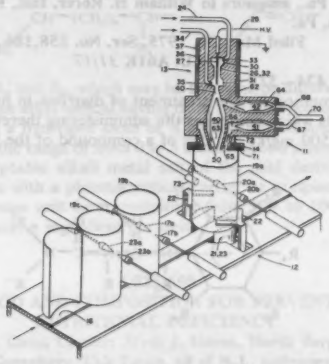
1. A coffee whitener composition consisting essentially of sugar, fat, stabilizing salt, an emulsifier and a proteinaceous ingredient; said proteinaceous ingredient being present in an amount of from about 2 to about 10% by weight based on the dry weight of the whitener composition, said proteinaceous ingredient consisting essentially of soy protein isolate and caseinate in a weight ratio of soy protein isolate:caseinate of from about 10:90 to about 80:20, provided that at least about 0.9% by dry weight of the whitener composition is casein.

4,025,660

## METHOD OF MASKING, VENTING AND COATING THE INSIDE OF A RECEPTACLE

**James R. Crose, Chelmsford, and Charles A. Hartnett, Beverly, both of Mass., assignors to W. R. Grace & Co., Cambridge, Mass.**

**Division of Ser. No. 651,163, Jan. 21, 1976, Pat. No. 3,995,586. This application Sept. 20, 1976, Ser. No. 724,822**
**Int. Cl.² B05D** *1/06*
**U.S. Cl. 427—28** **3 Claims**



1. A method of coating the inside of a receptacle comprising:

conveying and positioning an open receptacle in functional relationship to a masking and sealing dispenser head of unitary construction;

contacting said head and receptacle whereby said opening is sealed and masked with respect to the external receptacle surface and the dispenser is functionally associated with the inside of said receptacle;

venting said receptacle through a valved vent passageway communicating with the dispenser discharge conduit;

operating a discharge valve in said conduit;

operating a bypass valve in a bypass conduit located upstream of said discharge and vent valves;

establishing a coating material flow to the intake of said head;

selectively operating said valves whereby said bypass valve is closed when the discharge and vent valves are open to vent and charge said receptacle and whereby the vent and discharge valves are closed when the bypass valve is open to maintain said material flow;

establishing flow patterns of said material flow by designing said valves with conical nose portions; and

at least one said valve operation occurring by establishing a pressure force to annularly and laterally flex a closed sleeve element at an intermediate portion thereof, which sleeve is fixed at one end and attached at the other end to a movable one of said conical nose portions whereby to either close or open the associated valve passageway.

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4,025,661

## METHOD OF MAKING VIEWING-SCREEN STRUCTURE FOR A CATHODE-RAY TUBE

**John Joseph Moscony, Lancaster, and Joseph John Piascinski, Leola, both of Pa., assignors to RCA Corporation, New York, N.Y.**

**Filed Nov. 13, 1972, Ser. No. 305,695**
**Int. Cl.² H01J** *29/07*
**U.S. Cl. 427—68** **1 Claim**

1. In a method for making a viewing-screen structure for a cathode-ray tube having a viewing-screen support, a viewing screen thereon, and a light-reflective metal layer on said

screen, the steps subsequent to producing said metal layer comprising:

a. depositing upon said metal layer a coating of an organic volatilizable film-forming material,

b. depositing upon the coated metal layer an overcoating of carbon particles, said overcoating being deposited from a suspension consisting essentially of carbon particles, dispersant therefore and a liquid,

c. and then baking said screen in air at about 400° to 450° C to remove organic and volatile matter, the improvement wherein said organic volatilizable film-forming material and said suspension are free from substances which, when incinerated, produce residues containing alkali metal, alkaline earth metal, iron, manganese or titanium ions.

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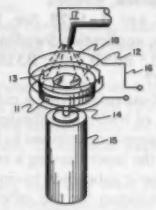
## 4,025,662
## METHOD FOR MAKING ULTRA HIGH RESOLUTION PHOSPHOR SCREENS

**Barbara E. Sumner, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Dec. 5, 1974, Ser. No. 529,875**
**Int. Cl.² B05B** *5/00*; **D06L** *3/12*
**U.S. Cl. 427—157** **5 Claims**



1. A method of forming an electroluminescent screen on a planar substrate comprising the steps of:

placing a few drops of solvent containing a dissolved thermoplastic material at the center of a broad exposed surface said substrate;

spinning the substrate about an axis normal to said broad surface at a gradually increasing angular velocity until the solvent spreads over the entire area of said broad surface of the substrate;

heating the substrate approximately to the softening temperature of said thermoplastic material;

while spinning and heating increasing said angular velocity until the thermoplastic material at the outermost edges of said substrate approaches its elastic limit;

spraying a mixture of high pressure nitrogen gas and fine phosphor particles of random diameters onto said heat softened thermoplastic material;

cooling said thermoplastic material to room temperature; and

flowing water over the surface of said thermoplastic material to remove non-embedded particles adhering thereto.

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## 4,025,663
## METHOD OF PRODUCING A TRANSLUCENT PANEL

**James Chester Brandt, 64 S. Ionia Ave., Grand Rapids, Mich. 49502**

**Filed Apr. 7, 1975, Ser. No. 565,722**
**Int. Cl.² B05D** *5/00*, *3/00*
**U.S. Cl. 427—161** **8 Claims**

1. A method of producing a translucent panel comprising:

a. cutting at least one piece of wood to a thickness of less than one-half inch measured in the direction of the grain;

b. impregnating said piece with a solvent for moisture and entrained liquids normally present in wood;

c. draining said piece;

d. impregnating said piece with an initially liquid polymerizable material miscible in said solvent, curable to a translucent solid; said impregnations being carried out so that the wood cells are continuously occupied by liquids; and

e. draining said piece and curing said material absorbed therein to fill the tubular cell structure of the wood with said translucent solid.

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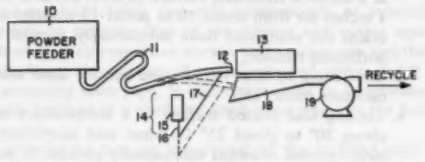
## 4,025,664
## CONTAINER COATING METHOD

**Gene Gerek, and Robert G. Coucher, both of Salt Lake City, Utah, assignors to EPPCO, Salt Lake City, Utah**

**Continuation-in-part of Ser. Nos. 430,094, Jan. 2, 1974, Pat. No. 3,962,486, and Ser. No. 486,464, July 8, 1974, Pat. No. 3,947,617. This application Nov. 25, 1974, Ser. No. 526,735**
**Int. Cl.² B05D** *7/22*
**U.S. Cl. 427—183** **27 Claims**




1. A process for coating the entire interior surface of a cylindrical type container having one open end and one closed end with an ultra-thin polymeric coating comprising:

a. preheating said container to a temperature of at least about 150° F;

b. spraying into the interior of said container from a location outside of said container a quantum of finely divided resin particles having maximum individual particle diameters of less than about 20 microns and a softening point less than about 150° F sufficient to coat the container interior with a continuous film, said resin entrained in a gas stream traveling at a velocity sufficient to create substantial turbulence in said container; and

c. rotating said container rapidly to create a vortex therein and to cause said container to rotate at least two revolutions during spraying of the resin particles.

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## 4,025,665
## PROCESS FOR COATING SURFACES WITH METAL-CONTAINING POWDER COATING COMPOSITIONS

**Martin J. Hannon, Martinsville, N.J., assignor to Celanese Corporation, New York, N.Y.**

**Filed Dec. 19, 1975, Ser. No. 642,416**
**Int. Cl.² B05D** *1/06*
**U.S. Cl. 427—192** **8 Claims**

1. In a process for coating a metal-containing powder coating composition containing resin and metal platelets on a surface by (a) coating said metal-containing powder composition on said surface, (b) heating said coated surface in order to melt said metal-containing powder coating composition, (c) cooling said coated surface the improvement comprising:

blowing a stream of hot fluid substantially parallel to said coated surface simultaneously with heating step (b) for a time sufficient to orient said metal platelets substantially parallel to said surface, and cooling said coated surface as in step (c) after said metal platelets have become oriented substantially parallel to said surface.

8. A process for coating an aluminum flake-containing acrylic powder coating composition on a horizontal surface, said aluminum flake-containing acrylic powder coating composition comprising from about 65 to about 85% by weight of an acrylic resin, from about 15 to about 30% by weight of blocked triisocyanate, prepared by reacting three moles of

1-isocyanato-3-isocyanatomethyl-3,5,5-trimethylcyclohexane with 1 mole of 1,1,1-tris-(hydroxymethyl) propane in methyl isobutyl ketone followed by blocking with methyl ethyl ketoxime, from about 1.25 to about 5% by weight of aluminum flake, and from about 1 to about 5% by weight of phthalocyanine blue pigment, such that, upon curing of said acrylic resin, said aluminum flake assumes an orientation parallel to said surface, said process comprising:

a. coating said aluminum flake-containing acrylic powder coating composition on said surface,

b. heating said coated surface to a temperature of from about 175° to about 225° C. at substantially atmospheric pressure in order to melt said aluminum flake-containing acrylic resin composition,

c. simultaneous with said heating step (b) blowing a stream of air which is at a temperature of from about 150° to about 200° C. substantially parallel to said surface at a velocity of from about 7 to about 15 feet per second and at a distance from said surface of from about 2 to about 4 inches for from about 10 to about 15 minutes so as to orient the aluminum flake substantially parallel to said horizontal surface,

d. continuing to heat said coated surface until said resin becomes cured, and

e. cooling said coated surface to a temperature of from about 20° to about 25° C. when said aluminum flakes have become oriented substantially parallel to said surface.

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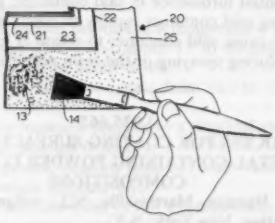
**4,025,666**

## COLORING CARDBOARD PICTURE MATS WITH DRY POWDER

**Donald Cameron Pierce, 59 Reposa Vista, Novato, Calif. 94947**

**Filed June 20, 1975, Ser. No. 588,965**
**Int. Cl.² B05D *5/00***
**U.S. Cl. 427—197** **6 Claims**




1. A method for coloring a dry surface portion of clean dry cardboard picture mats, or other dry paper sheets, comprising:

filling said dry surface to its capacity with a finely divided dry powder consisting essentially of a mixture of a pigment and a whitener in proportions to give a selected hue and saturation, and

then buffing the dry surface to give an even tone thereto.

5. A method for decorating the border of a cardboard picture mat, comprising:

providing boundary ink lines thereon to give a selected pattern and to define selected areas,

erasing pencil and other marks thereon and thoroughly cleaning the mat surface,

lightly applying dry into said selected areas liberal amounts of a finely divided dry powder consisting of a finely divided mixture of a pigment and a whitener, of a selected hue and saturation, working the powder into the mat surface of said areas, all while dry,

removing excess powder, and

dry-buffing the surface covered by said dry powder.

**4,025,667**

## ENZYME CARRIERS

**William H. Tomb, Corning, and Howard H. Weetall, Elmira, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.**

**Division of Ser. No. 227,205, Feb. 17, 1972, Pat. No. 3,783,101. This application July 30, 1973, Ser. No. 383,890**
**The portion of the term of this patent subsequent to Jan. 1, 1991, has been disclaimed.**
**Int. Cl.² B05D *7/00***
**U.S. Cl. 427—215** **1 Claim**

1. A method of improving the water-durability of controlled pore porous glass particles which comprises the steps of:

a. contacting porous glass particles having a particle size of 40 to 80 mesh with a solution of a chelated zirconium compound; and

b. heating the particles to a temperature between about 200° C. and 800° C. to form a thin, continuous layer of an oxide of zirconium on the surfaces of the porous glass particles.

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**4,025,668**

## METHOD OF MANUFACTURING CONTACT BODIES

**Per Norback, Lidingo, Sweden, assignor to Aktiebolaget Carl Munters, Sollentuna, Sweden**

**Filed Apr. 1, 1975, Ser. No. 564,116**
**Claims priority, application Sweden, Apr. 9, 1974, 7404818**
**Int. Cl.² B05D *3/04*; B32B *3/28, 19/08***
**U.S. Cl. 427—227** **9 Claims**

1. A method of manufacturing a contact body which is built up of thin layers of hydrated asbestos fillers shaped between mutually spaced support positions to form channels extending from end to end, the layers having a coating thereon formed of at least one inorganic substance having the property that it will form a support skeleton for the asbestos layers to which it is applied, after water in the asbestos fibers is removed therefrom, said method comprising the steps of heating the layer body to at least the dehydration temperature of the asbestos fibers to release the water of crystallization therefrom by heating a stream of gas and then passing a current of the heated gas through the channels in the body for a relatively short time of one hour or less to remove water, including the water of crystallization, from the body.

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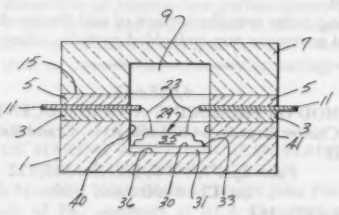
**4,025,669**

## MULTIPLE PASS METHOD OF APPLYING PRINTING PASTE UPON A SUBSTRATE

**Bernard Greenstein, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio**

**Division of Ser. No. 415,948, Nov. 15, 1973, Pat. No. 3,975,201. This application Dec. 3, 1975, Ser. No. 637,448**
**Int. Cl.² B05D *3/02, 5/12***
**U.S. Cl. 427—226** **19 Claims**




1. A multiple pass method of applying printing paste upon a substrate comprising the steps of:

applying to a substrate a first coat of a printing paste including about 80–92 weight percent of at least one finely divided, particulate inorganic material which can be fused, vitrified or crystallized at temperatures above

about 200° F. and about 8–20 weight percent of a liquid vehicle comprising:

a thermally stable organic binder which practically completely pyrolyzes while processing the property of being substantially thermally stable at temperatures below about 200° F. and constituting about 10–35 weight percent of said vehicle, and

a solvent system for said binder comprising a low boiling temperature organic solvent constituting about 30–70 weight percent of said vehicle and having a vapor pressure of less than about 2 mm Hg at a temperature in the temperature range about 20°–25° C. and having a vapor pressure in the vapor pressure range of about 2–100 mm Hg at a temperature in the temperature range of about 120° – 200° F., and a high boiling temperature organic solvent constituting about 20–40 weight percent of said vehicle and having a vapor pressure of about 1 mm Hg or less at a temperature in the temperature range of about 120° – 200° F. and having a vapor pressure in the vapor pressure range of about 2–100 mm Hg at a temperature in the temperature range of above about 200° F. to about 400° F.;

exposing said first coat to a temperature in the temperature range of about 120°–200° F. for a time sufficient to remove substantially all of said low boiling temperature solvent without substantially removing said high boiling temperature solvent,

thereafter superposing on said first coat an additional coat of printing paste having the above-defined characteristics of said first coat,

exposing said superposed additional coat to a temperature in the temperature range of about 120°–200° F. for a time sufficient to remove substantially all of said low boiling temperature solvent from said superposed additional coat,

subsequently exposing said first coat and said superposed additional coat to a temperature in the temperature range of above about 200° F. for a time sufficient to remove substantially all of said high boiling temperature solvent therefrom and practically completely pyrolyze said thermally stable binder and to fuse, vitrify or crystallize said particulate inorganic material.

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**4,025,670**

## CONTINUOUS PROCESS FOR LINING PIPES

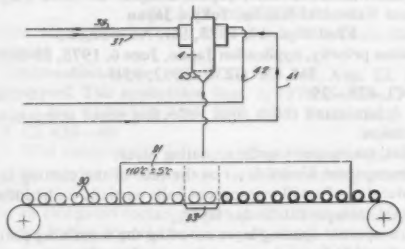
**John David Webster, and Thomas John Jewell, both of St. Austell, England, assignors to English Clays Lovering pochin & Company Limited, St. Austell, England**

**Division of Ser. No. 395,166, Sept. 7, 1973, Pat. No. 3,862,921. This application Nov. 4, 1974, Ser. No. 520,868**

**Claims priority, application United Kingdom, Sept. 14, 1972, 42786/72**

**Int. Cl.² B05D 7/22**

**U.S. Cl. 427—231** **1 Claim**



1. A continuous process for lining pipes with a thermosettable polymer which can be introduced into the pipes in the form of a liquid mixture of prepolymer and curing agent, which mixture is capable of setting to a resilient solid material, the process comprising:

a. heating the prepolymer to a temperature in the range in which the curing agent reacts with the prepolymer in liquid form to cure the latter;

b. degassing the prepolymer;

c. transferring the heated and degassed prepolymer to a first storage tank which is maintained at a substantially constant temperature within the said range;

d. providing the curing agent in liquid form at a temperature at which it is capable of curing the prepolymer and below that at which the curing agent deteriorates;

e. storing the liquid curing agent in a second storage tank which is maintained at a substantially constant temperature below that at which the curing agent deteriorates;

f. transferring the heated prepolymer and the liquid curing agent continuously in recycling circuits from the first and second storage tanks respectively to discrete ducts in a mixing head and back to the respective storage tanks, the mixing head being operable continuously or intermittently to stop the flow of prepolymer and curing agent back to their respective storage tanks and to mix and then discharge the mixture of prepolymer and curing agent;

g. arranging each pipe, in succession, with its longitudinal axis inclined at a predetermined acute angle to the horizontal;

h. introducing into an upper part of the inclined pipe a selected amount of the liquid mixture from the mixing head which is operated for a predetermined period of time to mix the prepolymer and the curing agent passing therethrough and discharge the resulting mixture flowing therefrom at a substantially constant predetermined rate directly into the pipe, the pipe being held stationary while the liquid material is introduced, the angle of inclination of the pipe and the rate of introduction of the liquid mixture being so arranged that the liquid mixture which is first introduced into the pipe flows along the inside wall of the pipe to a predetermined lower part of the pipe in the same time as that for completing the introduction of the selected amount of liquid mixture whereby the material is distributed along a length of the pipe;

i. thereafter shifting the pipe to a position in which its longitudinal axis is horizontal and then spinning the pipe about its longitudinal axis to distribute the polymer mixture around the inside of the wall of the pipe, spinning being continued until the polymer has set.

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**4,025,671**

## METHOD FOR APPLYING CONTINUOUS LONGITUDINAL BANDS OF LIQUID COATING TO A MOVING STRIP

**Robert M. Creamer, Richmond, Va., assignor to Philip Morris Incorporated, New York, N.Y.**

**Division of Ser. No. 323,302, Jan. 12, 1973, abandoned. This application Jan. 22, 1975, Ser. No. 543,126**

**Int. Cl.² B05D 5/00, 1/18**

**U.S. Cl. 427—286** **2 Claims**

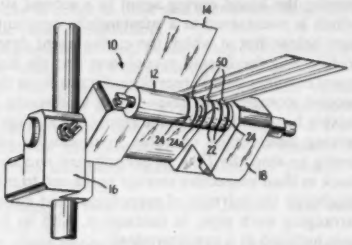
1. A method for applying continuous longitudinally extending bands of a liquid coating to a moving strip which comprises providing an elongated coating element having a convex outer surface, there being lands formed in said convex surface in a number corresponding at least to the number of coating bands to be applied, said lands having a width such as to yield the desired band coating width, said lands extending in encircling courses about the long axis of said coating element, each land being defined by a pair of grooves extending inwardly of said convex surface all of said grooves being disposed parallel with each other and transversely of said long axis, said coating element further having a central axial passage therein and radial passages connecting, with the central passage and outletting at an opening in the convex surface of each of said lands, the number of said openings corresponding to the number of

bands to be applied at the convex surfaces of said lands, and

fixedly disposing said element with its long axis extending transversely of the direction of the travel of the strip whereby the convex surfaces of said lands extend in the direction of strip travel

advancing the moving strip in a lead in-lead off contacting engagement with the convex surfaces of said lands,

fixing the positioning of said coating element in an orientation relative to the moving strip such as to provide that the openings at the convex surfaces of said lands are




located adjacent to but downstream of the point of lead-off contact of the moving strip with the convex surfaces of said lands, and feeding the coating material through said central passage and radial passages for outflow delivery of same at the openings at the convex surfaces of said lands, whereby there is established with the liquid outflowing from each of said openings a meniscus of liquid coating which contacts the said convex surface of each of said lands and said strip downstream of said point of lead-off contact, said meniscus being broken off sharply at the groove surfaces adjacent each of said lands, thereby causing said bands to be applied to said strip.

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**4,025,672**

## METHOD OF WEATHERPROOF CAULKING FOR THE OUTER SURFACES OF IRON AND STEEL

**Klaus Hossenfelder, Hiltrup, Germany, assignor to Glasurit Werke M. Winkelmann AG, Hiltrup, Germany**

**Continuation of Ser. No. 312,967, Dec. 7, 1972, abandoned, which is a division of Ser. No. 18,346, March 10, 1970, abandoned. This application July 28, 1975, Ser. No. 599,486**

**Claims priority, application Austria, Mar. 19, 1969, 2705/69**

**Int. Cl.² B05D** *7/14, 3/02*

**U.S. Cl. 427—388 C** **1 Claim**

1. A process for the weatherproof caulking of external metal surface base material containing iron comprising spraying thereon a thixotropic aqueous coating composition consisting essentially of:

a. 30 to 50 percent by weight of an aqueous dispersion binder of a copolymer formed by copolymerization of 35 to 65 percent by weight styrene, 10 to 64 percent by weight butadiene and 1 to 5 percent by weight of an unsaturated carboxylic acid having 3 to 30 carbon atoms;

b. 0.2 to 1.0 percent by weight of thickeners selected from the group consisting of acrylate-acrylic acid polymer dispersions, bentonite dispersions and mixtures thereof;

c. fibrous materials having a maximum length of 3 mm with at least 90 percent by weight thereof having a fiber length less than 0.5 mm selected from the group consisting of 16 to 30 percent by weight asbestos, 0.2 to 3 percent by weight polyamide fibers, 0.2 to 3 percent by weight polyester fibers or 0.2 to 3 percent by weight polyacryl nitrile fibers;

d. sufficient filler material and pigments that the total solids content of (a), (b), (c) and (d) is 55 – 70 percent; and

drying said coating composition to a layer thickness of about 200 to 2,000 microns.

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**4,025,673**

## METHOD OF FORMING COPY RESISTANT DOCUMENTS BY FORMING AN ORDERLY ARRAY OF FIBERS EXTENDING UPWARD FROM A SURFACE, COATING THE FIBERS AND PRINTING THE COATED FIBERS AND THE COPY RESISTANT DOCUMENT RESULTING FROM SAID METHOD

**Richard E. Reinnagel, 60 E. Jerge Drive, Elma, N.Y. 14059**

**Division of Ser. No. 243,743, April 13, 1972, Pat. No. 3,887,742. This application Mar. 27, 1975, Ser. No. 562,512**

**Int. Cl.² B32B** *33/00;* **B42D** *15/00;* **B44F** *1/00;* **D06C** *11/00*

**U.S. Cl. 428—29** **3 Claims**

1. A copy resistant document comprising: a sheet of material having an upper irregular surface comprised of a multiplicity of fibers extending upwardly from said sheet at angles less than 90° relative to the plane of said sheet, said fibers having a coating of a colored material thereon applied by spraying at an angle corresponding to the angle at which said document would normally be viewed for reading by the human eye, and graphical information imprinted on said irregular surface to produce a document easily readable at said normal human eye viewing angle but unreadable when viewed perpendicularly to the plane of said document to create a useless image for reproduction by a copying machine.

2. A method of forming a document to resist reproduction by copying machines comprising: treating the upper surface of a black sheet of material to form surface irregularities thereon consisting of a multiplicity of fibers extending upwardly from said sheet generally at an angle less than 90° relative to the plane of said sheet, coating said fibers by directing a spray of colored material thereon at an angle corresponding to the angle at which said sheet would normally be viewed for reading by the human eye, and printing graphical information on said surface irregularities to produce a document readable at typical human eye viewing angles, but unreadable when viewed perpendicularly to the plane of said sheet to create a useless image for reproduction by a copying machine.

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**4,025,674**

## REFLEX LIGHT REFLECTING SHEET

**Hisayuki Mizuochi, Sano, Japan, assignor to Seibu Polymer Kasei Kabushiki Kaisha, Tokyo, Japan**

**Filed Sept. 12, 1975, Ser. No. 612,693**

**Claims priority, application Japan, June 6, 1975, 50-068203**

**Int. Cl.² G23F** *13/02, 13/14*

**U.S. Cl. 428—29** **10 Claims**

1. A laminated reflex light reflecting sheet comprising in succession:

a flat, transparent surface coating layer,

a transparent binder layer at the rear of the coating layer,

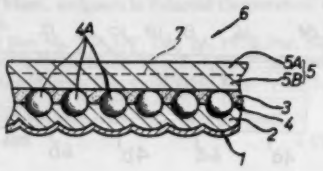
a plurality of small transparent balls partially embeddded in said transparent binder layer,

a transparent spacing layer covering the remaining portions of said balls, and

a reflective layer at the rear of said spacing layer,

said surface coating layer containing printing which is visible from the front of said surface coating layer in scattered daytime light, but substantially invisible in reflex

reflected light at night, said printing consisting of lines less than 0.5 mm in size and having a transmittance at




least 50% as great as the transmittance of said transparent layers.

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**4,025,675**

## REINFORCED LAMINATES

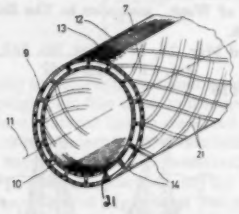
**Wolfgang Jonda, Oberpframmern, Germany, assignor to Messerschmitt-Bolkow-Blohm GmbH, Munich, Germany**

**Filed Dec. 11, 1974, Ser. No. 531,750**

**Claims priority, application Germany, Dec. 19, 1973, 2363155**

**Int. Cl.² B32B *3/12***

**U.S. Cl. 428—36** **4 Claims**




1. A laminate comprising first and second continuous spaced sheets of fiber-reinforced synthetic resin, with the reinforcing fibers in each sheet oriented to provide reinforcement in two directions of stress, said reinforcing fibers of each of said first and second sheets being arranged in two superimposed fiber layers, the fibers of one of the layers extending perpendicularly to the fibers of the other layer, and a supporting core sandwiched between said first and second sheets, wherein said supporting core consists of intersecting rib elements with unfilled spaces between one another extending in directions different from the directions in which the reinforcing fibers of said first and second sheets are oriented, said rib elements being composed of roving bundles impregnated with synthetic resin and wherein the intersecting rib elements with their synthetic resin impregnated roving bundles extend diagonally to the fibers of said first and second sheets.

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**4,025,676**

## COMPOSITE SKID CONSTRUCTION FOR MOVING HEAVY OBJECTS

**Glenn M. Koellisch, 7482 Reno Drive NE., Louisville, Ohio 44641**

**Continuation-in-part of Ser. No. 606,743, Aug. 22, 1975, abandoned. This application Sept. 1, 1976, Ser. No. 719,584**

**Int. Cl.² B32B *7/06, 3/30, 5/18*; F16F *15/00***

**U.S. Cl. 428—40** **7 Claims**

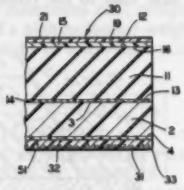
1. Skid construction for supporting a heavy object and for slidably moving said object over a surface having a hard finish including:

a. an elongated rectangular strip of stiff load-bearing material having top and bottom surfaces;

b. a strip of resilient cushioning material having top and bottom surfaces, said bottom surface being bonded to the top surface of the load-bearing strip;

c. pressure sensitive adhesive applied to the top surface of the strip of cushioning material for mounting the skid construction on a bottom portion of an object to be supported by said skid contruction;

d. a strip of matted fiber fabric bonded to the bottom surface of the load-bearing strip; and




e. wax impregnated into the strip of matted fiber fabric to facilitate the sliding of a supported object over a hard finish surface.

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**4,025,677**

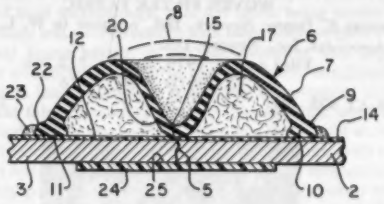
## TEMPORARY PATCH FOR A CRACK IN THE WALL OF A CONTAINER

**Ralph E. Belke, Oak Park, Ill., assignor to Belke Manufacturing Company, Inc., Chicago, Ill.**

**Filed Dec. 8, 1975, Ser. No. 638,508**

**Int. Cl.² B32B *3/26, 3/02*; B65D *53/00*; E21B *15/00***

**U.S. Cl. 428—63** **10 Claims**




1. A temporary patch for a crack in the wall of a container comprising a suction cup of elastomeric resilient material having a shape-recovering distortable dome portion and a peripheral wall-engaging portion, said dome portion being flexible and adapted upon application of said peripheral portion against the wall to be pressed against said wall in the vicinity of the crack to evacuate air from the interior of the dome; an adhesive bonding said dome in its depressed state to said wall in covering relation to the crack, said dome comprising means for expanding said dome upon failure of said adhesive to bond the same to the wall thereby providing an indication that said patch is not bonded to said wall

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**4,025,678**

## FLOCKED EXPANDED-PLASTIC FABRIC AND METHOD

**Robert J. Frank, Norwich, Conn., assignor to Pervel Industries, Inc., Plainfield, Conn.**

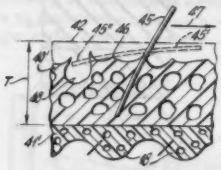
**Filed July 9, 1976, Ser. No. 704,092**

**Int. Cl.² B32B *3/26, 5/18, 33/00***

**U.S. Cl. 428—90** **25 Claims**

1. The method of continuously making an elongate fabric-reinforced flock-textured plastic-coated sheet, which comprises continuously applying a mix of liquid expandable plastic to a release sheet, and mix including a predetermined fraction of flock material that is bondable to the plastic, allowing the plastic to gel and to begin to expand and thus begin to orient a substantial fraction of the flock generally normal to the release sheet, continuously laminating a fabric to the plastic, allowing the plastic to complete its expansion, curing the

fabric-laminated expanded plastic, stripping the release sheet from the plastic-coated fabric to expose a skin, and continuously removing said skin from said plastic-coated sheet to expose both the cellular pockets of the expanded plastic and the free upstanding ends of flock that were less securely bonded to said skin than to the remainder of said plastic-coated sheet.



25. The plastic-coated sheet article which comprises a reinforcing fabric base, and an expanded plastic adhered to one side of said base, the outer exposed side of said expanded plastic being characterized by a randomly distributed plurality of cellular pockets, and a randomly distributed plurality of flock elements rooted at one end in the expanded plastic and projecting at the other end clear of and above the general plane of the outer exposed side of said expanded plastic.

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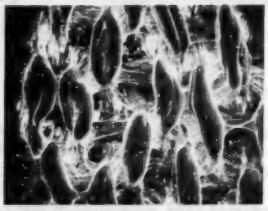
**4,025,679**

## FIBRILLATED POLYTETRAFLUOROETHYLENE WOVEN FILTER FABRIC

**Thomas E. Denny, Newark, Del., assignor to W. L. Gore & Associates, Inc., Newark, Del.**

**Filed Aug. 6, 1976, Ser. No. 712,166**
**Int. Cl.² B01D** *39/04, 39/16*
**U.S. Cl. 428—91** **20 Claims**



1. A fabric woven from strands of polytetrafluoroethylene in which said fabric possesses a multiplicity of fine fibrils of a fluorocarbon polymer interconnecting said strands, which fibrils are separated from each other by void spaces and are anchored at their opposite ends in said strands of said fabric.

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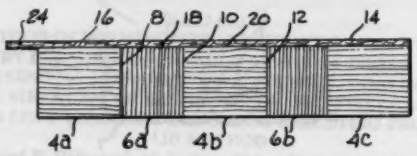
**4,025,680**

## CURVABLE FIBROUS THERMAL INSULATION

**Christos John Botsolas, Rumson, and Ronald Kostecki, Neshanic Station, both of N.J., assignors to Johns-Manville Corporation, Denver, Colo.**

**Filed Mar. 5, 1976, Ser. No. 664,116**
**Int. Cl.² B32B** *5/12;* **F16L** *9/14*
**U.S. Cl. 428—113** **8 Claims**

1. A flexible, bendable fibrous thermal insulation for cylindrical objects, said insulation comprising abutting, parallel strips of fibrous insulating material, wherein the fiber orientation in each strip is at right angles to the fiber orientation of each of the abutting strips; the fiber orientation of every second strip is disposed substantially circumferentially of the axis of said cylindrical object, and the fiber orientation of the remaining strips is disposed substantially radially of the axis of said cylindrical object; said insulation also having retention means comprising an overlying layer of flexible sheet jacketing material to which the abutting strips are adhered to retain the strips in abutting relationship; and said strips being of



substantially uniform radial width to form a generally cylindrical outer surface of said insulation.

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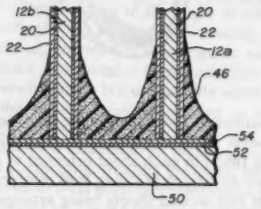
**4,025,681**

## ENVIRONMENTALLY DURABLE METAL HONEYCOMB STRUCTURE

**Dennis J. Donnelly, Renton; Joseph Arthur Marceau, Seattle; Joseph Corey McMillan, Mercer Island, and Yukimori Moji, Winslow, all of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Filed Mar. 24, 1975, Ser. No. 561,271**
**Int. Cl.² B31D** *3/02*
**U.S. Cl. 428—116** **7 Claims**



1. A method of forming an environmentally durable, corrosion resistant honeycomb core structure from aluminum metal comprising the steps of:

preparing a polymer receptive oxide coating on both surfaces of an aluminum foil by anodization of said aluminum foil in phosphoric acid said anodization taking place at a temperature in the range of about 75° F to 160° F. for 0.1 to 30 minutes at a potential of from 5 to 50 volts with phosphoric acid concentration of 5% to 50%;

applying a thin coating of an organic resin primer to said surfaces;

curing said primer to a coherent film to form a primed aluminum foil;

emplacing an adhesive on said primed aluminum foil, said adhesive being placed in locations chosen to from node bonds in a honeycomb structure;

stacking said foil;

curing said adhesive to form bonds between adjacent layers of primed aluminum foil to form a bonded stack of aluminum foil layers;

expanding said stack to form honeycomb cells therein forming a honeycomb core; and

bonding a face sheeet to opposed end edge surfaces of said core with an adhesive which wets the surfaces of said primed aluminum foil to from fillets extending into said honeycomb cells;

whereby a honeycomb core panel assembly is formed having all metal surfaces of said core coated with corrosion resistant, organic coating to render said core environmentally stable and resistant to corrosion.

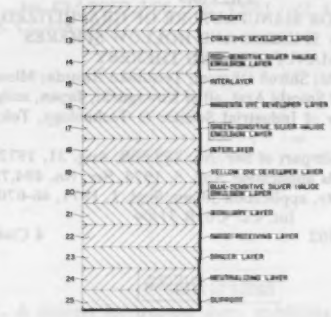
## 4,025,682
## PHOTOGRAPHIC PRODUCTS

Ronald F. W. Cieciuch, Newton, and Herbert N. Schlein, Beverly, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

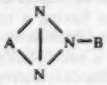
Division of Ser. No. 300,277, Oct. 24, 1972, Pat. No. 3,923,519, which is a continuation-in-part of Ser. No. 214,600, Jan. 3, 1972, abandoned. This application Aug. 7, 1975, Ser. No. 602,665

Int. Cl.² G03C *1/84, 5/54;* B32B *27/36*

U.S. Cl. 428—480 4 Claims



1. A substantially transparent, plastomeric support for diffusion transfer photographic film units, said support comprising a plastomeric sheet material having dispersed therein a pigment in an amount insufficient to prevent substantially all light incident on said support from being transmitted therethrough but sufficient to provide an optical density for the support of at least about 5 as measured edgewise at 700 mμ over a path length of one inch and additionally having dispersed therein a 2-aryl-4,5 arylo-1,2,3 triazole UV absorver which is substantially transparent to visible light said triazole being present in an amount providing an optical transmission density of at least 1 between the region from about 300 to about 375 mμ and where said traizole conforms to the following formula:



where:

A represents a phenylene radical bounded by two neighboring carbon atoms to two nitrogen atoms of the triazole ring and,

B represents a phenyl radical which can be substituted by groups not imparting strong coloration.

## 4,025,683
## URETHANE-BASED WATER-PROOFING/SOUND-PROOFING COATING COMPOSITION

Arthur L. Meader, Jr., Berkeley, and William L. Runyon, Jr., Richmond, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 396,042, Sept. 10, 1973, Pat. No. 3,900,687. This application Aug. 15, 1975, Ser. No. 605,102

Int. Cl.² B05D *1/36;* B32B *27/40, 11/04*

U.S. Cl. 428—215 14 Claims

1. A surface coated with a cast-in-place surfacing composition comprising, in order, from a the surface:

A. a prime coat comprising: (1) a paint vehicle, (2) a dark heat absorbing filler, (3) a volatile solvent, and (4) optionally, an inert filler, and

B. A membrane coat comprising 20 to 80 parts by weight of a polyurethane, 20 to 80 parts by weight of a substantially inert nonvolatile extender selected from the group consisting of cut-back asphalts and extender oils, and 0 to 20 parts by weight of a volatile solvent, said polyurethane formed by reacting a polyisocyanate with a polyurethane precursor at a mol ratio of 1.1–1.5:1, said polyurethane precursor of said membrane coat comprising 15 to 60 parts by weight of a high-molecular-weight polyol and 2 to 10 parts by weight of a low-molecular-weight chain stiffener.

## 4,025,684
## TUBULAR FABRIC COATED WITH PLASTICS OR SYNTHETIC RUBBERS

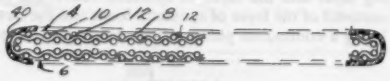
Helmut Neidhardt, Kurfurstenstrasse 19, 6450 Hanau, Germany

Continuation of Ser. No. 282,775, Aug. 22, 1972, abandoned. This application May 27, 1975, Ser. No. 580,829

Claims priority, application Germany, Sept. 2, 1971, 2143982

Int. Cl.² D03D *3/02, 11/00*

U.S. Cl. 428—257 8 Claims




1. In a flat, tubular fabric which is coated on both outside surfaces with a material that is substantially impervious to the passage of fluid therethrough, said flat fabric being woven in both the warp and weft directions with basic fibers to have two layers, said layers having, in the flat condition, side edges which are connected together so that said fabric is inflatable to include at least one hollow space, the improvement comprising said fabric including auxiliary threads, said auxiliary threads binding said two layers together in a close, tight woven formation extending over the total area of said fabric with the two layers fastened tightly and closely together to substantially temporarily prevent relative lateral movement between said two layers, said auxiliary threads having a tensile strength that is substantially lower than the tensile strength of said basic fibers so that, when said fabric is inflated to assume said tubular shape, said auxiliary threads will be broken.

## 4,025,685
## COMPRESSIBLE PRINTING BLANKET AND METHOD OF MANUFACTURE

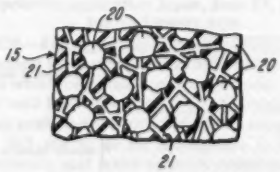
Doyle V. Haren, Clyde, and Arthur D. Logan, Waynesville, both of N.C., assignors to Dayco Corporation, Dayton, Ohio

Filed Sept. 6, 1974, Ser. No. 503,828

The portion of the term of this patent subsequent to Aug. 27, 1991, has been disclaimed.

Int. Cl.² B32B *3/00, 5/14*

U.S. Cl. 428—304 17 Claims

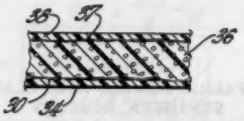



1. A laminated printing blanket comprising at least one fabric base ply, a surface layer, and a compressible intermediate layer, said intermediate layer comprising an elastomeric matrix having interconnected cavities distributed therethrough.

## 4,025,686
## MOLDED COMPOSITE ARTICLE AND METHOD FOR MAKING THE ARTICLE

**Earl M. Zion, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Filed June 26, 1975, Ser. No. 590,647**
**Int. Cl.² B32B *3/26***
**U.S. Cl. 428—310** **9 Claims**




1. A composite article comprising:
a layer of low density syntactic foam comprising a resinous material and a low density filler;
a reinforcing layer comprising fibrous reinforcing material superimposed on the layer of syntactic foam and penetrating thereinto; and,
an outer skin of resinous material penetrating the reinforcing layer and the layer of syntactic foam, the resinous material of the layer of syntactic foam and the outer skin being a continuous phase in the composite article.

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## 4,025,687
## LAMINATES

**Alan Metcalf Wooler, and Dennis Charlton Allport, both of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England**

**Filed Aug. 18, 1975, Ser. No. 605,504**
**Claims priority, application United Kingdom, Oct. 8, 1974, 43512/74**
**Int. Cl.² B32B *3/26***
**U.S. Cl. 428—310** **3 Claims**

1. A laminated panel which comprises a core of rigid isocyanurate based foam sandwiched between two facing sheets, characterized in that there is embedded within the foam core a wire mesh binding material, such that the wire mesh touches the surface of at least one facing sheet, the whole being bonded together by the foam core into a unitary construction.

2. A panel according to claim 1 wherein at least one facing sheet is made from a non-combustible material.

3. A panel according to claim 2 wherein the non-combustible material is sheet metal.

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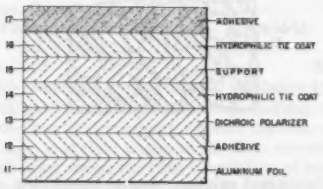
## 4,025,688
## POLARIZER LAMINATION

**Alexander W. Nagy, Dorado, P.R., and Giorgio B. Trapani, Cambridge, Mass., assignors to Polaroid Corporation, Cambridge, Mass.**

**Continuation-in-part of Ser. No. 493,569, Aug. 1, 1974, abandoned. This application Nov. 24, 1975, Ser. No. 634,635**
**Int. Cl.² C09J *7/02*; C09K *3/34*; G02B *5/30***
**U.S. Cl. 428—350** **6 Claims**




1. A light-polarizing light reflective lamination comprising a layer of aluminum foil having at least one matte surface and a light-polarizing film having first and second surfaces, said first surface being adhesively bonded with a transparent thermoplastic synthetic resin to said matte surface of said aluminum foil.

5. The lamination of claim 4 which includes a layer of adhesive on the second surface of said support layer whereby said lamination may be adhered to a field-effect transition liquid crystal device.

6. The lamination of claim 5 wherein said layer of adhesive is a water remoistenable adhesive.

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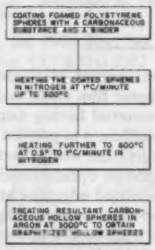
## 4,025,689
## METHOD FOR MANUFACTURE OF GRAPHITIZED HOLLOW SPHERES AND HOLLOW SPHERES MANUFACTURED THEREBY

**Kazuo Kobayashi; Shiroh Ohmori; Tetsuhiko Hasuda; Minoru Shiraishi, and Satoshi Arai, all of Kawaguchi, Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan**

**Continuation-in-part of Ser. No. 285,508, Aug. 31, 1972, abandoned. This application Aug. 5, 1974, Ser. No. 494,757**
**Claims priority, application Japan, Sept. 1, 1971, 46-67095**
**Int. Cl.² C01B *31/04***
**U.S. Cl. 428—402** **4 Claims**


COATING FOAMED POLYSTYRENE SPHERES WITH A CARBONACEOUS SUBSTANCE AND A BINDER
HEATING THE COATED SPHERES IN NITROGEN AT 1°C/MINUTE UP TO 300°C
HEATING FURTHER TO 600°C AT 0.5° TO 1°C/MINUTE IN NITROGEN
TREATING RESULTANT CARBONACEOUS HOLLOW SPHERES IN ARGON AT 3000°C TO OBTAIN GRAPHITIZED HOLLOW SPHERES

1. Light-weight hollow bodies consisting of shells each defining an empty interior space, the shells consisting of a graphitized carbonaceous substance defining a multiplicity of pores, each of the pores having a relatively large diameter opening facing the empty interior space and being ramified from the opening into a multiplicity of fine pores having smaller diameters than the diameter of the opening, the fine pores opening on the shell surface.

2. A method for the manufacture of graphitized hollow bodies each defining an empty interior space, which comprises
1. coating spherical cores of foamed polystyrene with a layer of a mixture of at least one carbonaceous substance selected from the group consisting of petroleum coke, pitch coke and carbon black with a binder to form coated spheres having a diameter of 0.5 to 20 mm,
2. heating the coated spheres in an inert gas first to a temperature of 300° C at a rate increasing by 1° C/minute until each spherical core of foamed polystyrene is melted and decomposed to generate gas and to cause the generated gas to penetrate through the layer and disperse into the ambient atmosphere while the layer forms a shell constituting a hollow body of the carbonaceous substance defining the empty interior space,
a. the gas penetrating through the shell producing a multiplicity of fine through pores, each of the pores having a relatively large diameter opening facing the empty interior space and being ramified from the opening into a multiplicity of fine pores having smaller diameters than the diameter of the opening, the fine pores opening on the outer shell surface,
3. then heating the hollow bodies in nitrogen gas to a temperature of 6000° C at a rate increasing from 300° to 600° C by 0.5° to 1° C/minute, and

4. thereafter heating the hollow bodies in argon gas to a temperature of 3000° C.

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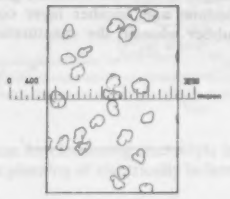
## 4,025,690

## METHOD OF PREPARING ADDITIVES AND ADDITIVES PREPARED ACCORDING TO SAID METHOD

Augusto Nanni, Bologna, Italy, assignor to Reagens S.p.A. Industria Chimica, Bologna, Italy

Continuation-in-part of Ser. No. 160,176, July 6, 1971, abandoned. This application Apr. 19, 1974, Ser. No. 462,391
Claims priority, application Italy, July 6, 1970, 51934/70
Int. Cl.² B05D 7/00, 3/02; C08J 3/22; C08K 3/10
U.S. Cl. 428—407 7 Claims



1. A process for treating dusty stabilizing or lubrication additives for a homopolymer and copolymer of vinyl chloride, acrylonitrile, butadiene or styrene to convert said dusty additive to a free-flowing, non-dusty form, comprising:

a. Mixing at least one of said dusty additives in powdered form with non-dusty particles of at least one of said polymers in the absence of a plasticizer, the additives constituting from 1/6 to 5/6 of said mixture;

b. Heating said mixture, while continuing said mixing, to a temperature sufficient to cause particles of said dusty additive to be absorbed by the non-dusty particles of said polymer, without changing the particle size or causing agglomeration of said polymer particles; and

c. Cooling said mixture.

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## 4,025,691

## ORGANIC SEMICONDUCTOR ELEMENT

Donald J. Trevoy, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

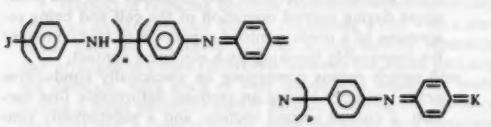
Division of Ser. No. 482,960, June 25, 1974, Pat. No. 3,963,498, which is a continuation-in-part of Ser. Nos. 212,640, Dec. 27, 1971, abandoned, and Ser. No. 455,705, March 28, 1974, abandoned. This application Feb. 2, 1976, Ser. No. 654,438
Int. Cl.² G03C 1/78, 1/96; A41D 1/00
U.S. Cl. 428—411 8 Claims

1. A semiconductor element comprising a support having thereon a semiconductor having organic solvent solubility and represented by the expression:

$$D[A]_q$$

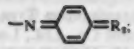
wherein:

D represents a moiety having the structure:

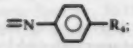


in which

J represents either $R_1$ or a group having the formula



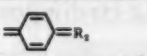
K represents either $R_5$ or a group having the formula



$R_1$ and $R_4$ are each selected from the group consisting of a hydrogen atom, a hydroxy radical, a lower alkyl radical, a lower alkoxy radical, an amino radical, an aryl radical, an acyl radical, a carboxylate radical, a thio radical, a nitrate radical, a sulfonate radical, a halogen atom and a cyano radical;

$R_2$ and $R_3$ each represent (1) an uncharged radical selected from the group consisting of oxo, imino and thioxo radicals or (2) a charged radical selected from the group consisting of alkoxonium, iminium, and sulfonium radicals, and

n and p are each integers having the following combinations of values:

| | |
|---|---|
| when J represents  and K represents $R_5$, | p=0 n=0, 1, 2, 3, 4, 5<br>p=1 n=0, 1, 2, 3<br>p=2 n=0, 1 |
| when J represents $R_1$ and K represents $R_5$, | p=0 n=0, 1, 2, 3, 4, 5, 6<br>p=1 n=0, 1, 2, 3, 4<br>p=2 n=0, 1, 2<br>p=3 n=0 |
| when J represents $R_1$ and K represents | p=0 n=0, 1, 2, 3, 4, 5<br>p=1 n=0, 1, 2, 3<br>p=2 n=0, 1; |

A is an acid when $R_2$ and $R_3$ are each an uncharged radical and when $R_2$ and/or $R_3$ is a charged radical, A is an anion derived from an acid; and

*q* represents the number of A moieties associated with each D and is a positive integer that is greater than 0 and less than or equal to the number of amine groups in the D moiety.

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## 4,025,692

## METHOD FOR FORMING CORROSION-RESISTANT COATING ON A STEEL SHEET

Hidehisa Yamagishi, Yokohama; Atuhiko Murao, Kawasaki, and Hisao Tsutsumi, Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed June 10, 1975, Ser. No. 585,489
Claims priority, application Japan, June 17, 1974, 49-68942
Int. Cl.² B05D 3/06
U.S. Cl. 428—418 17 Claims

1. A method for forming a corrosion-resistant coating on a steel sheet which comprises applying a water solution on the surface of said steel sheet, followed by drying; and exposing the coated surface to ultraviolet rays having a main wave length of 365 mμ in an air atmosphere to obtain a cured coating; wherein said water solution contains a composition comprising (i) a prepolymer of an epoxy resin selected from the group consisting of bisphenol and novolak-phenol type reacted with an acid selected from the group consisting of acrylic acid and methacrylic acid, (ii) a chelate-forming compound selected from the group consisting of a chromate and a dichromate, and (iii) a water-soluble compound of molybdenum to stabilize said water solution.

4,025,693

## ANTI-FOULING MARINE COMPOSITIONS

Alexander Milne, Newcastle upon Tyne, England, assignor to The International Paint Co., Ltd., London, England

Filed Dec. 17, 1975, Ser. No. 641,780

Claims priority, application United Kingdom, Jan. 20, 1975, 2291/75

Int. Cl.² C09D 5/14, 5/16

U.S. Cl. 428—447 4 Claims

1. A marine surface having a coating comprising a silicone rubber-silicone oil mixture produced by cold-curing an oligomeric silicone rubber having hydroxyl end groups in the presence of a silicone oil, said coating being substantially free from silicone resin.

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4,025,694

## MAGNETIC RECORDING MEDIUM HAVING SEGMENTED COPOLYESTER BINDER

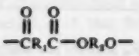
Wayne A. Pletcher, Roseville, and Russell L. Vermillion, Hastings, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed June 30, 1975, Ser. No. 591,936

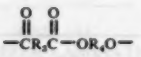
Int. Cl.² G11B 5/70

U.S. Cl. 428—480 7 Claims

1. Magnetic recording medium comprising a nonmagnetizable backing member bearing a coating of magnetizable particles in a binder, which binder consists essentially of a thermoplastic segmented copolyester consisting essentially of about 25 to 75 percent by weight of amorphous ester units and 75 to 25 percent by weight of crystallizable ester units joined through ester linkages, the crystallizable ester units beng of the formula



and the amorphous ester units being of the formula



wherein

$R_1$ is primarily tetramethylene, phenylene and/or naphthalene,

$R_2$ consists of divalent radicals remaining after removal of the hydroxyl groups of one or more saturated aliphatic diols containing 1–12 carbon atoms,

$R_3$ is $R_1$ or $R_5$ where $R_5$ consists of divalent radicals remaining after removal of the carboxyl groups of saturated aliphatic dimer acids and contains 22–50 carbon atoms, and

$R_4$ is $R_2$ or $R_6$ where $R_6$ consists of divalent radicals remaining after removal of the terminal hydroxyl groups of long chain aliphatic diols having average molecular weights of 200–4000,

at least one of $R_3$ and $R_4$ in each amorphous ester unit is $R_5$ or $R_6$, and where $R_1$ is essentially entirely aromatic, the copolyester contains at least 50 per cent by weight of amorphous ester units, and

said copolyester has a DTA melting temperature of from about 65° to 150° C, an inherent viscosity of at least 0.5 dl/g at 25° C, as measured in 0.3 g/dl solution in chloroform at 25° C, and a Tg less than 0° C.

4,025,695

## METHOD OF COVULCANIZING CHLORINATED LOW UNSATURATION RUBBERS WITH HIGH UNSATURATION RUBBER

Neil F. Newman, Edison, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Division of Ser. No. 537,857, Jan. 2, 1975, Pat. No. 3,985,832. This application Jan. 28, 1976, Ser. No. 653,080

Int. Cl.² C08L 7/00, 9/00, 9/06

U.S. Cl. 428—492 5 Claims

1. A laminated composition of matter comprising one layer of chlorobutyl rubber and a halogen-containing organic compound, wherein the halogen is bonded to a carbon atom which is in turn bonded to 1 to 3 functional groups capable of stabilizing the positive charge at the halogen-carbon bond, and wherein the halogen is selected from the group consisting of bromine and iodine; and another layer comprising a high unsaturation rubber wherein the unsaturation is at least 30 mole %.

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4,025,696

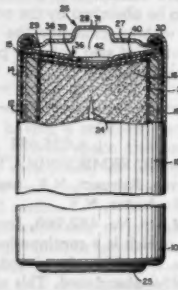
## SAFETY SWITCH FOR SMALL DIAMETER GALVANIC CELLS

Gary Ronald Tucholski, and Frank George Spanur, both of Parma Heights, Ohio, assignors to Union Carbide Corporation, New York, N.Y.

Filed May 24, 1976, Ser. No. 689,525

Int. Cl.² H01M 2/00

U.S. Cl. 426—61 10 Claims



1. A sealed galvanic cell assembly comprising in combination:

a cylindrical metal container including a positive and negative electrode and an electrolyte, with said container being in electrical contact with said positive electrode;

an outer cover mounted over said metal container and being of a predetermined configuration to form a substantially centrally located cavity between said cover and said container;

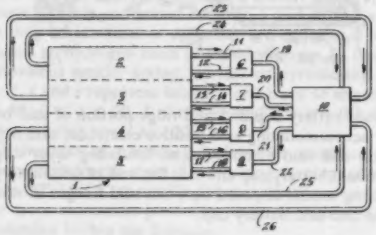
switch means disposed in said cavity for providing an electrical connection between said container and said outer cover during normal operation of the cell and being responsive to a predetermined expansion of said container for irreversibly breaking such electrical contact;

said switch means comprising an electrically conducitive active member having an inclined deformable first section, a curved second section, and a substantially centrally disposed opening with said switch means being held in a slidable relationship relative to said container and outer cover respectively.

## 4,025,697
## APPARATUS FOR CIRCULATING ELECTROLYTE AROUND MULTI-SECTION BATTERIES

Thomas G. Hart, Royal Oak, Mich., assignor to Energy Development Associates, Madison Heights, Mich.

Filed Oct. 29, 1975, Ser. No. 626,792
Int. Cl.² H01M 2/40
U.S. Cl. 429—70 5 Claims



1. An apparatus for circulating electrolyte in a multi-section battery having a plurality of electrically isolated cells comprising:

a plurality of electrically isolated cells,

pump means having an inlet and an outlet for forcing electrolyte through the cells of said battery,

means between each of the individual cells of said battery and the outlet of said pump means for circulating said electrolyte in a closed loop through each of said individual cells,

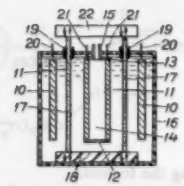
conduit means between the outlet of said pump means and said circulating means, and

conduit means between each of said individual cells and the inlet to said pump means for recycling said electrolyte.

## 4,025,698
## ACCUMULATOR BATTERY APPARATUS AND METHOD

Otto von Krusenstierna, Taby, Sweden, assignor to Aktiebolaget Tudor, Sundbyberg, Sweden

Continuation-in-part of Ser. No. 422,591, Dec. 6, 1973, Pat. No. 3,923,550, which is a continuation of Ser. No. 186,219, Oct. 4, 1971, abandoned. This application Dec. 1, 1975, Ser. No. 636,655
Claims priority, application Sweden, Oct. 9, 1970, 13696/70; July 16, 1975, 7508110; July 16, 1975, 7508111
The portion of the term of this patent subsequent to Dec. 2, 1992, has been disclaimed.
Int. Cl.² H01M 4/28
U.S. Cl. 429—4 16 Claims

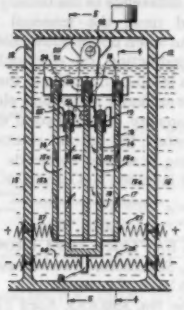


1. Method of reducing dendrite formation when repeatedly charging an accumulator battery containing a cell with a zinc anode part and a cathode, and an ion-permeable separator part arranged in a fluid electrolyte between the anode part and the cathode, with each of said anode and separator parts having a large generally planar surface defining the plane of said part and a comparatively small thickness in a direction perpendicular to said plane, which comprises vibrating one of the parts in the cell in the direction of the plane of the parts during the charging process with a frequency and an amplitude sufficient to provide macro and micro turbulence effects in the electrolyte thereby inhibiting dendrite formations and shape-forming deposits of zinc on said anode part.

## 4,025,699
## MANGANESE STORAGE BATTERY

Lou Silva, c/o George Spector, 3615 Woolworth Bldg., 233 Broadway, and George Spector, 3615 Woolworth Bldg., 233 Broadway, both of, New York, N.Y. 10007

Filed Nov. 24, 1975, Ser. No. 634,521
Int. Cl.² H01M 10/04
U.S. Cl. 429—72 9 Claims

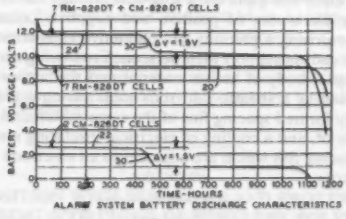


1. In a manganese storage battery a battery case divided into a plurality of cells, zinc negative plates and carbon positive plates with separators therbetween being in each said cell, said plates being connected electrically to exterior battery terminal posts, and an electrolyte comprised of manganous hydroxide and water.

## 4,025,700
## VARIABLE PRECISION MULTIVOLTAGE STEP BATTERY

Franklin G. Fagan, Jr., Ossining, and Stephen J. Angelovich, Yonkers, both of N.Y., assignors to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Continuation of Ser. No. 458,257, April 5, 1974, abandoned. This application Oct. 20, 1975, Ser. No. 624,071
Int. Cl.² H01M 6/00
U.S. Cl. 429—91 2 Claims




ALARM SYSTEM BATTERY DISCHARGE CHARACTERISTICS

1. A battery comprising series connected electric cells each having substantially the same electrical discharge capacity and operating life time, wherein all of the series connected electric cells include first electrodes with the same sole active material and a substantially fixed electrical potential over the operating life time of the battery and at least one cell but not all of the series connected electric cells includes a second electrode composed of a plurality of different active materials; the materials of the second electrode having different electrical potentials relative to the fixed electrical potential of the first elec-

trode, the chemical energy of the material of the second electrode having the highest relative potential against the first electrode being substantially converted to electrical energy prior to conversion to electrical energy of the chemical energy of any other material of the second electrode, the conversion of the higher potential material to occur under a current discharge condition which is substantially constant, the change from conversion to electrical energy of the chemical energy of the higher potential material to conversion to electrical energy of the chemical energy of the lower potential material to occur at a predetermined time during the operating life of the battery, the change to result in an abrupt voltage drop of about 0.75 volt for each of the cells having an electrode with a plurality of different materials thereby creating a significant voltage difference in the battery terminal voltage at the predetermined time, the terminal voltage difference adapted to be useful when continuously monitored to indicate need for time related action, the electrochemical capacity of the first electrodes in all of the cells in the battery being substantially the same as each other and slightly less than the electrochemical capacity of the second electrodes in any of said cells, and wherein the second electrode of each of the electric cells having a second electrode with a plurality of different materials inculdes HgO and CdO.

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**4,025,701**

## LEAD STORAGE BATTERY ELECTRODE AND METHOD

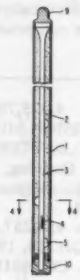
**Erik G. Sundberg, Stockholm, Sweden, assignor to Aktiebolaget Tudor, Stockholm, Sweden**

**Continuation of Ser. No. 350,653, April 12, 1973, abandoned. This application Apr. 15, 1975, Ser. No. 568,168**

**Claims priority, application Sweden, Apr. 18, 1972, 724998**

**Int. Cl.² H01M *4/75***

**U.S. Cl. 429—140** **3 Claims**



1. An electrode plate for a lead-acid storage battery having alternate electrodes of positive and negative polarity, said plate comprising a plurality of conductive rods connected at opposite ends in support members, each rod being surrounded by a tubular body of active material and the active material surrounded by a sheath, said rods each having a plurality of integrally formed spacing fins of the same material as the rods are made of, and a coating of electrical insulating material on those spacing fins which are adjacent to an electrode of opposite polarity.

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**4,025,702**

## BATTERY CONSTRUCTION

**Hajime Nishimura, Tokyo, and Yasushi Nomura, Tokorozawa, both of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan**

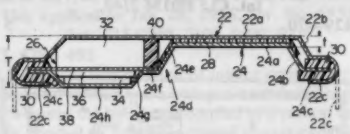
**Filed Mar. 5, 1976, Ser. No. 664,326**

**Claims priority, application Japan, Mar. 10, 1975, 50-28759; June 9, 1975, 50-77801; Oct. 29, 1975, 50-147649**

**Int. Cl.² H01M *2/02***

**U.S. Cl. 429—142** **11 Claims**

1. In a battery having a positive electrode, a negative electrode and an electrolyte, the improvement comprising: a battery cup including a flange at its outer periphery; a battery cap including a flange at its outer periphery, said battery cap having a generally flat wall idented from the flange of said cap and a ridge portion extending from said flat wall toward said flange of said cap; at least one battery chamber formed between said battery cup and said ridge portion of said battery cap for accommodating said positive electrode, said negative electrode and said electrolyte; an insulating layer disposed between said battery cup and said flat wall of said battery cap; and sealing means disposed between said flanges of said battery cup and said battery cap.

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**4,025,703**

## HYDROPHILIC MODIFIED ACRYLIC POLYMERS PARTICULARLY HYDRODISPERSIBLE OR HYDROSOLUBLE MODIFIED ACRYLIC POLYMERS AND METHOD OF PREPARING THE SAME

**René Pornin, Arthez-de-Bearn; Jean-Henri Blanc, Pau, and Robert Voirin, Mourenx, all of France, assignors to Societe Nationale Elf Aquitaine (Production), Paris, France**

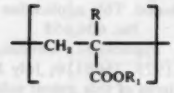
**Filed July 23, 1975, Ser. No. 598,184**

**Claims priority, application France, July 26, 1974, 74.26009**

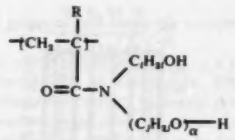
**Int. Cl.² C08F *8/32, 220/04, 220/06***

**U.S. Cl. 526—16** **21 Claims**

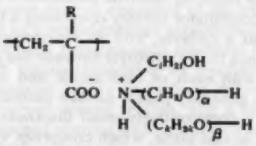
1. Novel hydrodispersible or hydrosoluble modified acrylic polymer comprising expressed in molar percentages, *p* % units A having the formula:



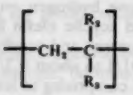
*q* % units B having the formula:



*r* % units C having the formula:

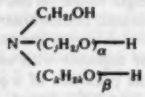


and *s* % units D having the formula:



wherein each R stands for hydrogen, methyl or ethyl groups, and $R_1$ designates hydrogen or an alkyl group containing 1 to 4 carbon atoms, the symbols R and $R_1$ never representing at the same time an hydrogen atom or a methyl group, *i*, *j* and *k* designate integers comprised between 1 and 6, and $\alpha$ and $\beta$, which may be identical or different, are equal to 0 or 1, $R_2$ represents an hydrogen atom or a methyl group, $R_3$ designates a monovalent amido, amino, pyridyl or pyrrolidonyl group, and *p*, *l*, *r* and *s* represent integers which are so selected that $1 \leq p \leq 85$, $0 \leq q \leq 90$, $5 \leq r \leq 95$ and $0 \leq s \leq 30$, the sum $(p+q+r+s)$ being equal to 100.

8. A method of preparing hydrophilic modified acrylic polymers according to claim 1 comprising the steps of reacting between 50°–150° C an acrylic polymer which is derived from one or more monomers producing units A, with at least one alkanolamine having the formula:



wherein *i*, *j*, *k* represent numbers comprised between 1 and 6, and wherein $\alpha$ and $\beta$, which may be identical or different, are equal to 0 or 1, and then separating the thus obtained modified acrylic polymer from the reaction medium.

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## 4,025,704
## ORGANIC SEMICONDUCTORS

**Donald J. Trevoy, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Division of Ser. No. 482,960, June 25, 1974, Pat. No. 3,963,498, which is a continuation-in-part of Ser. No. 212,640, Dec. 27, 1971, abandoned, and Ser. No. 455,705, March 28, 1974, abandoned. This application Feb. 2, 1976, Ser. No. 654,439**

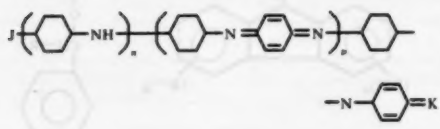
**Int. Cl.² C08F *8/30*; G03C *1/78***

**U.S. Cl. 526—16** **3 Claims**

1. A semiconductor having organic solvent solubility and represented by the expression:

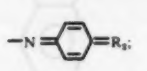
wherein:

D represents a moiety having the structure:

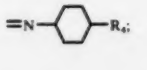


in which

J represents either $R_1$ or a group having the formula



K represents either $R_3$ or a group having the formula



$R_1$ and $R_4$ are each selected from the group consisting of a hydrogen atom, a hydroxy radical, a lower alkyl radical, a lower alkoxy radical, an amino radical, an aryl radical, an acyl radical, a carboxylate radical, a thio radical, a nitrate radical, a sulfonate radical, a halogen atom and a cyano radical;

$R_2$ and $R_3$ each represent (1) an uncharged radical selected from the group consisting of oxo, imino and thioxo radicals or (2) a charged radical selected from the group consisting of alkoxonium, iminium, and sulfonium radicals; and

*n* and *p* are each integers having the following combinations of values:

| | | |
|---|---|---|
| when J represents | | |
| and K represents $R_3$, | $p=0$ | $n=0, 1, 2, 3, 4, 5$ |
| | $p=1$ | $n=0, 1, 2, 3$ |
| | $p=2$ | $n=0, 1$ |
| when J represents $R_1$ and K represents $R_3$, | $p=0$ | $n=0, 1, 2, 3, 4, 5, 6$ |
| | $p=1$ | $n=0, 1, 2, 3, 4$ |
| | $p=2$ | $n=0, 1, 2$ |
| | $p=3$ | $n=0$ |
| when J represents $R_1$ and K represents | $p=0$ | $n=0, 1, 2, 3, 4, 5$ |
| | $p=1$ | $n=0, 1, 2, 3$ |
| | $p=2$ | $n=0, 1;$ |

A is a polymeric acid when $R_2$ and $R_3$ are each an uncharged radical and when $R_2$ and/or $R_3$ is a charged radical, A is an anion derived from an polymeric acid; and

*q* represents the number of A moieties associated with each D and is a positive integer that is greater than 0 and less than or equal to the number of amine groups in the D moiety.

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## 4,025,705
## INSOLUBLE ADSORBER RESIN SUITABLE FOR TREATING DRINKING WATER AND SEWAGE

**Herbert Corte, Opladen; Harold Heller, Cologne; Michael Lange, and Otto Netz, both of Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Germany**

**Continuation of Ser. No. 480,563, June 18, 1974, abandoned. This application Oct. 20, 1975, Ser. No. 623,785**

**Claims priority, application Germany, June 23, 1973, 2332103**

**Int. Cl.² C08F *212/00***

**U.S. Cl. 526—19** **5 Claims**

1. An insoluble adsorber resin comprising a matrix based on a crosslinked organic polymer containing aromatic nuclei, in which the polymer is substituted by 0.05 to 1.2 chlormethyl groups per aromatic nucleus and the chlorine in the chloromethyl group is partially reacted with ammonia or an amine to form aminomethyl groups, the ratio of the resulting aminomethyl groups to the chlormethyl groups being in the range of from 5:95 to 80:20.

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## 4,025,706
## COMPOSITION WITH PEROXIDES AND PROCESS FOR AVOIDING SCORCHING OF ETHYLENE POLYMER COMPOSITION

**Donald Lincoln Schober, Belle Mead, N.J., assignor to Union Carbide Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 527,853, Nov. 27, 1974, abandoned. This application Jan. 23, 1976, Ser. No. 651,835**

**Int. Cl.² C08F *8/06*; C08J *3/24***

**U.S. Cl. 526—57** **44 Claims**

1. A scorch resistance vulcanizable composition comprising, in weight ratio,

100 parts by weight of ethylene polymer,

about 0.1 to 5.0 parts by weight of at least one peroxide

selected from the group consisting of bis(tertiary-butylperoxy-isopropyl)benzene and 2,5-dimethyl2,5-di(tertiary butyl peroxy)hexane, and

about 0.1 to 2.0 parts by weight of at least one hydroperoxide selected from the group consisting of cumene hydroperoxide and tertiary butyl hydroperoxide,

said composition having an efficiency factor of at least about 3 units above the efficiency factor of said composition in the absence of said hydroperoxide when said efficiency factor is determined on the basis of rheometer curves obtained from a Monsanto Rheometer at a cure temperature of 360° F., using a rheometer oscillation of 110 CPM and an arc of ±5°.

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## 4,025,707
## MIXED HYDROCARBYLOXIDE TREATED CATALYST ACTIVATED AT DIFFERENT TEMPERATURES

**John P. Hogan, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 455,740, March 28, 1974, Pat. No. 3,959,178. This application Feb. 25, 1976, Ser. No. 661,083**

**Int. Cl.² C08F *4/24*, *4/52*, *10/00***

**U.S. Cl. 526—105** **15 Claims**

1. A process which comprises: contacting at least one polymerizable olefin under polymerization conditions with a mixed catalyst produced by activating in dry air at least one first supported chromium oxide portion at a first temperature within the range of 500° to 1100° F; activating in dry air at least one second supported chromium oxide portion at a second temperature within the range of 1200° to 2000° F, said second temperature further being at least 200° F above said first temperature; said activating being sufficient to convert at least a portion of the chromium to the hexavalent state; thereafter combining said thus activated first and second portions to form a composite, the weight ratio of said first portion to said second portion being within the range of 1:6 to 12:6, and treating thus formed composite or said activated portions prior to combination with from 0.5 to 10 weight percent, based on the weight of said composition of a hydrocarbyl aluminum hydrocarbyloxide, said contacting being carried out in a liquid diluent at a temperature such that at least a substantial part of polymer produced is insoluble in said diluent.

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## 4,025,708
## PROCESS FOR POLYMERIZING CYCLOPENTENE

**Robert J. Minchak, Parma Heights, and Robert E. Beauregard, Copley, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio**

**Filed Mar. 24, 1975, Ser. No. 561,500**

**Int. Cl.² C08F *210/00*, *212/00***

**U.S. Cl. 526—142** **10 Claims**

1. A process comprising polymerization of cyclopentene with from 0% to about 98% by weight, based upon total polymer weight, of at least one other copolymerizable cycloolefin in the presence of

1. a catalyst comprising (a) at least one compound selected from the group consisting of dialkylaluminum iodides, alkylaluminum diiodides and mixtures of trialkylaluminum compounds with iodine wherein each alkyl group contains from 2 to 8 carbon atoms, the catalytically effective amount of said dialkylaluminum iodide, alkylaluminum diiodide or trialkylaluminum is from about 0.1 to about 10 millimoles per mole of total cyclopentene and copolymerizable cycloolefin, and the molar ratio of elemental iodine to trialkylaluminum compound is from about 0.25/1 to about 6/1 moles per mole, and (b) at least one tungsten compound at a concentration from about 0.01 to about 1.0 molar in an ester solvent, said compound (a) being charged before said compound (b), and the molar ratio of (a)/(b) being from about 1/1 to about 80/1.

2. at least one nonconjugated acyclic olefin containing from 2 to 12 carbon atoms and having at least one acyclic mono olefin or one hydrogen on each double-bonded carbon atom, said acyclic olefin being used in a molar ratio total cyclopentene and copolymerizable cycloolefin from about 0.0001/1 to about 0.3/1 mole per mole, and

3. said ester solvent comprising at least one alkyl ester of a saturated carboxylic acid or dicarboxylic acid, said ester solvent containing from 2 to 20 carbon atoms and being substituted by 0 to 3 halogen atoms.

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## 4,025,709
## PROCESS FOR THE POLYMERIZATION OF VINYLIDENE FLUORIDE

**Jean Blaise, Oullins, and Edouard Grimaud, Saint-Genis-Laval, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France**

**Filed Sept. 22, 1975, Ser. No. 615,206**

**Claims priority, application France, Sept. 24, 1974, 74.32093**

**Int. Cl.² C08F *14/22***

**U.S. Cl. 526—225** **6 Claims**

1. Process for the homopolymerization of vinylidene fluoride or the copolymerization of vinylidene fluoride with less than about 10% by weight based on the vinylidene fluoride of an ethylenically unsaturated comonomer known to be copolymerizable therewith, which comprises polymerizing the vinylidene fluoride alone or together with said comonomer in an aqueous medium in the presence of a peroxide initiator and between about 0.2% and 0.5% based on the weight of the water of a water-soluble salt of a compound corresponding to the formula

$$R_f—C_3H_4SO_3H$$

in which $R_f$ is a perfluoroalkyl radical containing from 4 to 10 carbon atoms.

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## 4,025,710
## INTRACHAIN CHARGE TRANSFER COMPLEXES

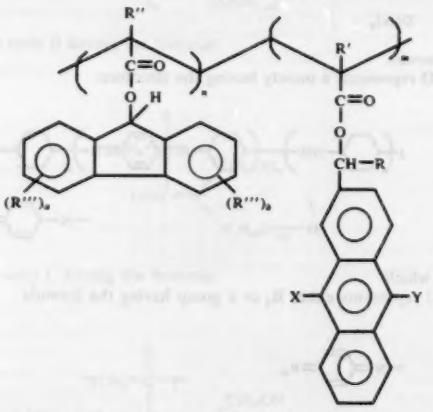
**Milan Stolka, Fairport, and Sam R. Turner, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Division of Ser. No. 596,531, July 16, 1975. This application Sept. 13, 1976, Ser. No. 722,447**

**Int. Cl.² C08F *220/16***

**U.S. Cl. 526—284** **2 Claims**

1. A random copolymer of the formula: I




wherein

R is hydrogen or methyl;

R' is hydrogen or methyl;

R'' is alkyl of 1–5 carbon atoms;

R''' is selected from the group consisting of $-NO_2$, halogen, —CN and $CF_3$;
X and Y are independently selected from the group consisting of hydrogen, chlorine, bromine, alkyl of 1–4 carbon atoms and phenyl;
*a* and *b* can range from 0–4; and
*n* can range from about 5 to about 95 percent of the total number of structural units of the copolymer; and
*m* can range from about 5 to about 95 percent of the total number of structural units of the copolymer.

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## 4,025,711
## LATEX COAGULATION PROCESS USING LIGNIN COMPOUND

**Melvin John George Davidson, Yarimca, Turkey, and Richard Helmut Wunder, Corunna, Canada, assignors to Polysar Limited, Sarnia, Canada**

**Filed Mar. 8, 1976, Ser. No. 665,075**
**Claims priority, application Canada, Mar. 20, 1975, 222661**
**Int. Cl.² C08F *6/22***
**U.S. Cl. 528—488** **5 Claims**

1. A process of recovering synthetic styrene-conjugated diolefin polymers from aqueous latex which comprises coagulating the latex, in the substantial absence of sodium chloride, at a temperature of from about 100° F to about 180° F in the presence of sufficient sulphuric acid to maintain the pH of coagulation at about 2.5 to about 3.5 and subsequently separating the coagulated polymer from the serum, the improvement being the addition of from about 0.2 to about 5 parts by weight, per 100 parts by weight of dry polymer solids, of a lignin compound selected from powdered lignin, sodium lignate, potassium lignate and ammonium lignate.

4. The process of claim 1 in which the coagulation is conducted in the presence of a water soluble polyamine, polyamide or cationic emulsifier in an amount of from about 0.02 parts to about 0.3 parts by weight per 100 parts by weight of dry polymer solids.

5. The process of claim 1 in which the styrene-conjugated diolefin polymer is a styrene-butadiene rubber optionally containing an extender oil.

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## 4,025,712
## METHOD FOR ENHANCING THE SOLUBILITY OF DRIED LATEX POLYMER

**Alvin J. Frisque, Western Springs, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.**

**Continuation of Ser. No. 561,736, March 24, 1975, abandoned. This application July 30, 1976, Ser. No. 710,761**
**Int. Cl.² C08F *6/22***
**U.S. Cl. 528—488** **5 Claims**

1. An improved method of preparing substantially dry, dust-free, readily soluble polymers and copolymers of water-soluble ethylenic-unsaturated monomers comprising the steps of:

A. preparing a water-in-oil emulsion which employs an alkaline sensitive emulsifying agent and which contains dispersed therein a finely-divided water-soluble vinyl addition polymer;
B. preparing a water mixture which contains dispersed therein from 0.1 to 10% by weight based on polymer of a water-soluble surfactant;
C. contacting the emulsion of Step (A) for about 0.5 to 10 seconds with a sufficient volume of the water mixture of Step (B) to reduce the solids level of the emulsion to 15 to 25% by weight to produce a partially inverted emulsion;
D. casting the partially inverted emulsion of Step (C) upon a surface to form a thin film;
E. heating the film of the partially inverted emulsion to provide a dry film polymer product; and,
F. recovering the dry film product;

wherein the improvement comprises the step of hydrolyzing the alkaline sensitive emulsifying agent by adjusting the pH of the partially inverted emulsion of Step (C) to at least 11.5 with a water-soluble base prior to forming a thin film of Step (D).

4,025,713

## ELECTRIC GLASS-MELTING FURNACES

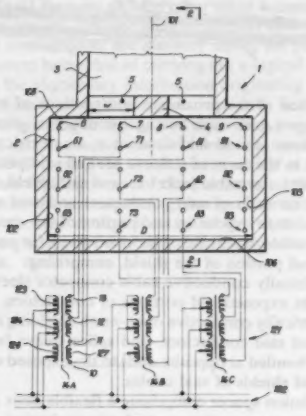
Vaclav Suesser; Josef Vach; Ivan Ladr, and Jiri Auerbeck, all of Hradec Kralove, Czechoslovakia, assignors to Statni vyzkumny ustav sklarsky, Hradec Kralove, Czechoslovakia

Filed Dec. 16, 1975, Ser. No. 641,176

Claims priority, application Czechoslovakia, Dec. 20, 1974, 8850/74

Int. Cl.² C03B 5/02

U.S. Cl. 13—6 4 Claims



1. In an electric glass-melting furnace, a substantially rectangular melting zone having upwardly extending walls for receiving a glass melt to a desired first height, the zone having a first transverse and a second longitudinal dimension; a working zone longitudinally adjacent the melting zone; a vertical partition disposed at the interface between the working and the melting zones, the partition defining at its lower end and a restricted passage for accommodating a flow of glass melt between the melting and working zones; at least first, second and third spaced, transversely successive, longitudinally extending rows of elongated electrodes, each electrode extending upwardly from and directly affixed to the bottom surface of the melting zone, each row having first and second longitudinally spaced, transversely aligned electrode units; multiphase, multitap supply voltage means for generating first, second and third AC voltages having identical, relatively large amplitudes and exhibiting a progressive phase shift therebetween, and fourth, fifth and sixth AC voltages having identical, relatively small amplitudes and the same progressive phase shift therebetween, the first and fourth voltages exhibiting the same relative phase; first means for individually coupling the first and second voltages between the first units of the first and second rows and between the first units of the second and third rows, respectively; and second means for individually coupling the fourth and fifth voltages between the second units of the first and second rows and between the second units of the second and third rows, respectively.

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4,025,714

## SELF-LOCKING TERMINAL ASSEMBLY

Kenneth L. Quick, Oglesby, and Dennis R. Blevins, Peru, both of Ill., assignors to Electrical Utilities Company, LaSalle, Ill.

Filed Apr. 4, 1975, Ser. No. 565,011

Int. Cl.² H01B 17/30

U.S. Cl. 174—18 12 Claims

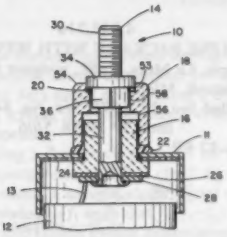
1. A self-locking terminal assembly for a capacitor containing an impregnating fluid, said capacitor defining an opening therethrough, comprising, in combination:

an integral terminal stud including a first and second end portion, a collar portion intermediate said first and second end portions and a shank portion adjacent said collar portion;

an interior insulating member including a flange portion and a crown portion, said interior insulating member defining a passage therethrough, said opening interlockingly receiving said crown portion in an assembled state;

an insulator having an insulator opening, said insulator opening interlockingly receiving said crown portion of said interior insulating member, said insulator interposing said flange portion and said capacitor in said assembled state;

an exterior insulating member defining a first and second cavity and a connecting passage therebetween, said second cavity telescopically and interlockingly receiving said crown portion of said interior insulating member in said assembled state, said connecting passage substantially aligning with said passage of said interior insulating member, whereby said first and second insulating members



receive said terminal stud, said passage and said first cavity receiving said second end portion and said collar portion, respectively, of said terminal stud, said connecting passage interlockingly receiving said shank portion, said integral terminal stud, interior insulating member and exterior insulating member defining a free space therebetween in said assembled state;

a first sealing member interposed said capacitor and said exterior insulating member; and

means for securedly clamping said capacitor between said insulator and said exterior insulating member in said assembled state, whereby said capacitor, terminal stud, interior insulating member and exterior insulating member are mutually interlocked to substantially avoid rotation of said terminal assembly with respect to said capacitor;

said insulator defining means for providing access to said free space for said impregnating fluid to substantially improve the voltage characteristics of said capacitor.

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4,025,715

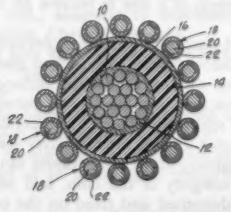
## SHIELDED ELECTRIC CABLE

Dennis D. Foley, Cheshire, Conn., and John N. Reynolds, Williamsport, Pa., assignors to Alcan Aluminum Corporation, Cleveland, Ohio

Filed Mar. 15, 1976, Ser. No. 666,743

Int. Cl.² H01B 11/06, 7/18

U.S. Cl. 174—36 15 Claims



1. A shielded electric cable comprising:

a. a metallic conductor,
b. insulation surrounding said conductor,
c. a layer of semiconducting material around said insulation, and
d. a multiplicity of separate, coated aluminum wires extending lengthwise of the cable and distributed around the exterior of said semiconducting layer,
e. each of said wires having a coating of semiconducting material.

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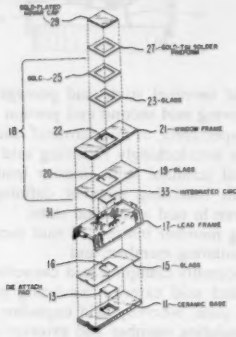
**4,025,716**

## DUAL IN-LINE PACKAGE WITH WINDOW FRAME

**Robert S. Morse, La Mesa, Calif., assignor to Burroughs Corporation, Detroit, Mich.**

**Filed Jan. 30, 1975, Ser. No. 545,387**
**Int. Cl.² H05K** *5/06*
**U.S. Cl. 174—52 FP** **5 Claims**




1. An electronic device package having a ceramic base for receiving an integrated circuit chip; a first lead glass layer selectively deposited and fixed on said base; and a lead frame fused in position on said lead glass layer at a selected temperature range; in combination, the improvement comprising means facilitating the encapsulation of an integrated circuit on said base at a second relatively lower temperature range than said selected temperature range by a cover member, said means including:

a ceramic window frame substantially coextensive with the top surface of said ceramic base for fusement thereover at substantially the said selected temperature range to present a flat planar surface for maintaining the lead frame fuse in position on said base and for providing a protection layer substantially over the entire surface of said lead frame, said window frame having a window centrally formed therein of a size to receive an integrated circuit chip;

a second lead glass layer selectively deposited on the underside of window frame, said second glass layer securing said ceramic window to said top surface of said ceramic base sandwiching said lead frame between said window frame and said top surface of said ceramic base; and

means for fusing a cover member over said window at said second relatively lower temperature range to protect the electrical integrity of the chip, said means including a gold ring deposited and fixed on the other side of said ceramic window frame circumscribing and contiguous to said window.

**4,025,717**

## HIGH VOLTAGE SHIELDED CABLE SPLICE

**William F. Whittingham, 6029 Primrose Ave., No. 1, Temple City, Calif. 91780**

**Filed May 7, 1975, Ser. No. 575,221**
**Int. Cl.² H01R** *5/02;* **H02G** *1/14*
**U.S. Cl. 174—88 C** **3 Claims**

1. A splice of the proximate end portions of two shielded high voltage cables each having a conductor, primary insulation in a layer around said conductor, an electrically conductive shield in the form of a sleeve around said primary insulation, and an outer cable jacket around said shield, the primary insulation on each of said conductors and said shield being stripped back to expose an end portion of the conductor, and the outer cable jacket being stripped back far enough to expose an end portion of the shield, comprising:

an electrically conductive cable connector sleeve connecting the exposed end portions of conductors;

an electrically conductive open-mesh shielding splice sleeve around said conductors, said splice sleeve being electrically bonded at opposite ends to the exposed end portions of said shields of said cables;

an insulation spacer comprising a flexible helix mounted on said connector sleeve, said spacer having an exterior cylindric surface concentric with said conductors and supporting said splice sleeve in a position concentric with said conductors;

a tubular splice jacket surrounding said cable jackets, with its opposite ends joined thereto on opposite sides of said splice, said tubular splice jacket being annularly spaced from said cable jackets between its ends; and

a body of electrically insulating filler material, of high dielectric strength and high electrical resistance solidly filling the otherwise open space inside said tubular splice jacket, and continuing through the open-mesh splice sleeve to fill all interior open space therewithin.

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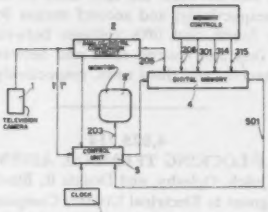
**4,025,718**

## METHOD AND APPARATUS FOR RECORDING IN A MEMORY TRAJECTORIES AND TRACES OF OBJECTS

**Claudio R. Paretti, Rome, Italy, assignor to Comitato Nazionale per l'Energia Nucleare, Rome, Italy**

**Filed Dec. 2, 1975, Ser. No. 637,013**
**Claims priority, application Italy, Dec. 10, 1974, 54455/74**
**Int. Cl.² H04N** *7/18*
**U.S. Cl. 358—280** **6 Claims**




1. An apparatus intended to store in a digital memory the set of information obtained by comparing by means of a logical operator the information previously stored in the said memory with the information originating from a television camera, said television camera being capable of scanning a

picture composed of a plurality of elementary areoles and of supplying at the output in the form of an electric signal an elementary information for each of the said areoles; the aforesaid apparatus comprising, in addition to the said television camera, a device for defining a field within said picture and for establishing a one-to-one correspondence between each elementary areole of said field and one storage location of a memory having at least as many locations as the areoles comprised within said field; at least one logical operator having two inputs and one output, whereof one input is connected to the output of said memory and the other input is connected to the television camera through analogic/digital converter and the output is connected to the memory input, the purpose of such arrangement being that of carrying out a logical comparison between the elementary information originating from the individual areoles within the television camera's field and the information originating from the corresponding storage location; a clock synchronous with the television camera's line pulses capable of causing the simultaneous arrival at the input of the aforesaid logical circuit of the elementary information originating from the corresponding storage location and the entering into the said storage location of the signal obtained from the comparison of the said information through the logical circuit.

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**4,025,719**

## PHASE-DIRECTED DECISION FEEDBACK EQUALIZER

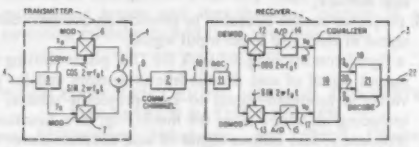
**Henri Nussbaumer, LaGaude, France, assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jan. 15, 1976, Ser. No. 649,300**

**Claims priority, application France, Feb. 21, 1975, 75.05906**

**Int. Cl.² H04L 27/18**

**U.S. Cl. 178—67** **12 Claims**




1. In a digital data communication system using the digital phase modulation technique, a method for equalizing a communication channel which introduces phase and amplitude distortions such that at any given instant a received signal is the sum of a transmitted signal and a distorting signal representative of the sum of said phase and amplitude distortions, said method including the steps of:

determining the value $\theta_0$ of the phase of the received signal at a sampling time $t_0$,

converting said phase value $\theta_0$ into the trigonometric functions cos $\theta_0$ and sin $\theta_0$,

measuring approximate values $\tilde{\Delta}u$ and $\tilde{\Delta}v$ of said distorting signal in said received signal,

deriving a phase error signal, $(\theta_0-\tilde{\alpha}_0)$, said phase error signal $(\theta_0-\tilde{\alpha}_0)$ being defined as

$(\theta_0-\tilde{\alpha}_0) = \arcsin(\tilde{\Delta}v_0 \cos\theta_0 - \tilde{\Delta}u_0 \sin\theta_0)$

subtracting said phase error signal from said value $\theta_0$ to provide an approximate value $\alpha_0$ of the phase of the signal as transmitted and

using said approximate value $\tilde{\alpha}_0$ to select a discrete value $\tilde{\alpha}_0$ as the probable value of the phase of the signal transmitted at sampling time $t_0$.

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**4,025,720**

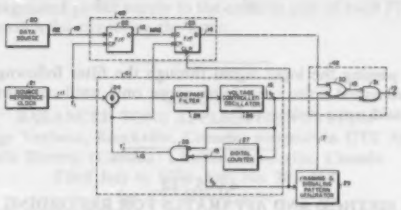
## DIGITAL BIT RATE CONVERTER

**Alvin L. Pachynski, Jr., Redwood City, Calif., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.**

**Filed May 30, 1975, Ser. No. 582,325**

**Int. Cl.² H04J 3/06**

**U.S. Cl. 178—69.1** **5 Claims**




1. In a digital data transmission system having a transmitter and a receiver, apparatus at said transmitter for increasing the bit rate $f_1$ of a digital data signal and forming a composite line signal of bit rate $f_2$ having a predetermined framing pattern, said apparatus comprising:

means for providing a first clock signal of bit rate $f_1$;

timing means responsive to said first clock signal, said timing means providing a second clock signal of bit rate $f_2$ wherein, $f_2$ is related to $f_1$ such that $f_1/(f_2-f_1)$ is a rational, fixed number, said timing means comprising:

a phase-locked loop having a phase comparator, a low pass filter, a digital voltage-controlled oscillator, and a feedback circuit of said phase-locked loop further comprising:

means for sequentially counting predetermined numbers of bits from said oscillator and generating a third binary clock signal having a bit rate of $(f_2-f_1)$ and a pulse width of $1/f_2$; and

logic means interrupting said second binary clock signal in response to said third binary clock signal;

means for upconverting said digital data signal to an upconverted bit stream comprised of nonredundant sampled data bits of said $f_2$ bit rate, and having periodic signal gaps which have a duration of $1/f_2$ and which occur at a rate of $f_2-f_1$, said upconverter comprising:

means responsive to said first and second clock signals for generating a fourth binary clock signal $f_1'$ having an average bit rate $f_1$ and associated periodic gaps therein of duration $1/f_2$ occurring at an average rate of $(f_2-f_1)$ with an average bit rate between said gaps of $f_2$; and

means sampling digital data signal in response to said fourth clock signal;

means for generating stuffed bits, said bits including framing bits having a predetermined pulse sequence; and

means for interleaving said upconverted bit stream with said stuffed bits forming said composite line signal.

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**4,025,721**

## METHOD OF AND MEANS FOR ADAPTIVELY FILTERING NEAR-STATIONARY NOISE FROM SPEECH

**Daniel Graupe, Fort Collins, Colo., and G. Donald Causey, Chevy Chase, Md., assignors to Biocommunications Research Corporation, Chevy Chase, Md.**

**Filed May 4, 1976, Ser. No. 683,234**

**Int. Cl.² H04R 27/00**

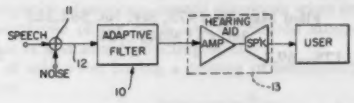
**U.S. Cl. 179—1 P** **28 Claims**

1. A method for adaptively filtering noise of the type described from speech comprising the steps of:

a. periodically identifying the parameters representing the characteristics of an input signal comprising said noise and speech;

b. detecting the occurrence of pauses containing said noise between speech intervals;

c. adjusting the parameters of a filter to those identified in response to detection of a pause containing said noise; and




d. passing the input signal through the filter followng the detected noise containing pause only until cessation of said noise is detected.

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**4,025,722**

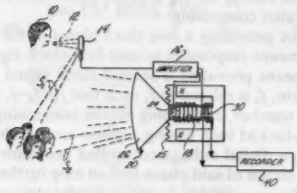
**METHOD AND APPARATUS FOR RECORDING**

**Leo Karron, 154-18 17th Road, Whitestone, N.Y. 11357**

**Filed Mar. 10, 1976, Ser. No. 665,724**

**Int. Cl.² H04R** *3/04*

**U.S. Cl. 179—1 P** **4 Claims**




1. The method of recording a primary sound program before a live audience comprising the step of:

a. converting the primary sound program to electrical signals;

b. amplifying the electrical signals;

c. energizing a loud speaker voice coil with the amplified electrical signal;

d. moving said loud speaker voice coil in response to sounds from the audience chamber to generate a magnetic field;

e. positioning a pick-up coil within the magnetic field surrounding the voice coil when the coil is electrically emergized to pick up the electrical signals and signals from the audience; and

f. recording the electrical signals induced in the pick-up coil.

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**4,025,723**

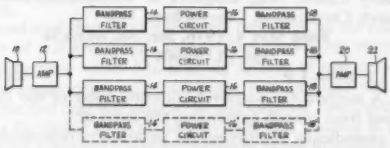
**REAL TIME AMPLITUDE CONTROL OF ELECTRICAL WAVES**

**Vernon O. Blackledge, Scottsdale, Ariz., assignor to Hearing Health Group, Inc., Scottsdale, Ariz.**

**Filed July 7, 1975, Ser. No. 593,306**

**Int. Cl.² H03G** *3/00, 7/00;* **H04R** *25/00*

**U.S. Cl. 179—1 VL** **4 Claims**




4. A wave volume control comprising:

a. a plurality of band-pass input filters to which a wave whose volume is to be controlled may be applied.

b. a respective power circuit to the input of which the output of each said input filters is connected,

c. each power circuit consisting of a log circuit, an amplifier, and an antilog circuit connected in cascade,

d. a like plurality of band-pass output filters to the input of which the output of respective power circuits are connected, and

e. said band pass input filters and said band pass output filters passing substantially the same bands of frequencies.

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**4,025,724**

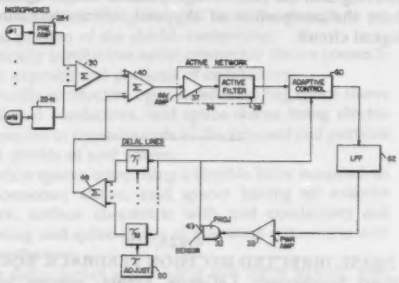
**NOISE CANCELLATION APPARATUS**

**Allen R. Davidson, Jr., Bowie, and Timothy G. F. Robinson, Severna Park, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Aug. 12, 1975, Ser. No. 603,978**

**Int. Cl.² H04B** *15/00*

**U.S. Cl. 179—1 P** **18 Claims**




18. Apparatus for cancelling acoustic noise radiated by a surface, comprising an array of sound cancellation units each said unit including:

A. a plurality of accelerometer sensors mounted directly on said surface for providing an electrical signal indicative of said acoustic noise generated by a predetermined zone of said surface;

B. projector means operable to provide an acoustic output signal in response to an input signal;

C. a signal conditioning network for 180° phase shifting said output signal of said accelerometer sensors and for providing a modified signal to said projector means, and including an active filter for modifying, as a function of frequency, said output signal of said accelerometer sensors.

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**4,025,725**

**TELECOMMUNICATION SWITCHING NETWORK HAVING A MULTISTAGE REVERSED TRUNKING SCHEME AND SWITCHING ON A FOUR WIRE BASIS**

**Karl Euler, Pullach, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Nov. 10, 1975, Ser. No. 630,493**

**Claims priority, application Germany, Nov. 14, 1974, 2454144**

**Int. Cl.² H04Q** *11/04*

**U.S. Cl. 179—15 AT** **2 Claims**

1. A pulse code modulated (PCM), time division multiplex (TDM) telecommunication switching network having a multistage reverse trunking arrangement for switching single channel subscriber lines on a four wire basis, comprising:

a plurality of subscriber lines,

a first switching stage comprising a plurality of termination circuits, each connected to receive audio frequency analog signals from a said subscriber line and for converting those signals to pulse code modulated, time division mul-

tiplex signals, said termination circuits being formed into groups and sub-groups,

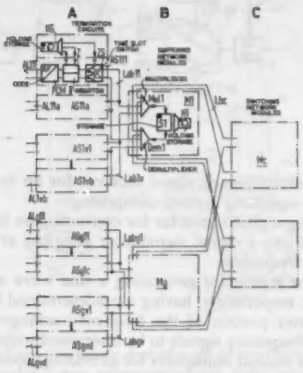
a second switching stage comprising a plurality of switching modules, each said module being connected to outputs of a group of said termination circuits,

each said switching module comprising a multiplexer, an addressable storage for time position conversion having its input connected to the multiplexer output and a demultiplexer having its input connected to the storage output,

first TDM line means commonly connecting each said termination circuit in a sub-group to a said switching module, the output of each said termination circuit being connected to a multiplexer input and demultiplexer output of the said switching module assigned to that sub-group,

a third switching stage comprising a plurality of switching modules, each module including a multiplexer and a demultiplexer and

second TDM line means connecting other multiplexer inputs and demultiplexer outputs in each said switching module in said second switching stage to, respectively, multiplexer inputs and demultiplexer outputs in said switching modules in said third switching stage.

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**4,025,726**

## CATHODE GATE TRIGGERING METHOD AND SYSTEM FOR SPEECH PATH SWITCHES

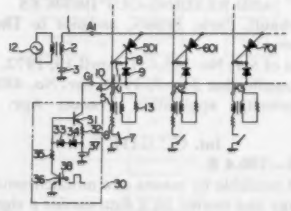
**Mitsuo Matsuyama, Yokohama, and Shinzi Okuhara, Fujisawa, both of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Dec. 16, 1975, Ser. No. 641,298**

**Claims priority, application Japan, Dec. 20, 1974, 49-145568**

**Int. Cl.² H04Q *3/52***

**U.S. Cl. 179—18 GF** **13 Claims**



1. A gate triggering method for a speech path switch using $m \times n$ PNPN switches as switching elements arranged in a matrix form in which each row of PNPN switch arrays constituted of $n$ PNPN switches are connected in common at the anode thereof, comprising the steps of:

a. connecting the $1 \times n$ PNPN switches constituting each said row array in multiple at the cathode gates thereof to substantially a single control gate common line through respective diodes;

b. connecting said control gate common line to a single constant-current regulated power supply capable of switching the output current thereof by being controlled by an external control source; and

c. supplying a constant current from said constant-current regulated power supply to the cathode gate of each PNPN switch for triggering the same.

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**4,025,727**

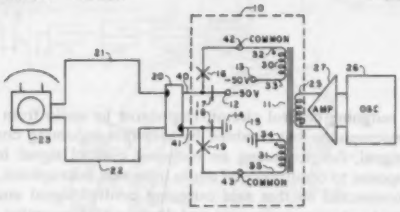
## BALANCED TONE APPLICATION SYSTEM

**George Verbaas, Brockville, Canada, assignor to GTE Automatic Electric (Canada) Limited, Brockville, Canada**

**Filed July 6, 1976, Ser. No. 702,568**

**Int. Cl.² H04M *3/04***

**U.S. Cl. 179—18 HB** **7 Claims**




1. A balanced tone application system for applying dial tones, busy tones, or the like generated by a tone generator, to telephone transmission line pairs in a balanced manner and for use in a telephone exchange of the type having a supervisory relay coupled across each transmission line pair, said system comprising:

a transformer having a primary coupled to the tone generator and a secondary including first and second windings;

a power source coupled to said first winding;

a source of common potential coupled to said second winding; and

switching means coupled to said first winding, said second winding, said power source, said source of common potential, and to a supervisory relay, and said switching means being capable of assuming first and second states for connecting the supervisory relay only to said power source and to said source of common potential when in said first state to thereby apply only energizing power to the supervisory relay and to the transmission line pair associated with the supervisory relay, and for connecting the supervisory relay to said power source, to said source of common potential, and to said first and second windings when in said second state to thereby apply both energizing power and the tone generated by the tone generator through said first and second windings to the supervisory relay and to the transmission line pair associated with the supervisory relay, whereby the supervisory relay isolates its associated transmission line pair from all other transmission line pairs.

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**4,025,728**

## SPEAKER TELEPHONE

**Sava Jacobson, 8130 Orion, Van Nuys, Calif. 91406**

**Filed Jan. 29, 1976, Ser. No. 653,387**

**Int. Cl.² H04M *1/60***

**U.S. Cl. 179—81 B** **17 Claims**

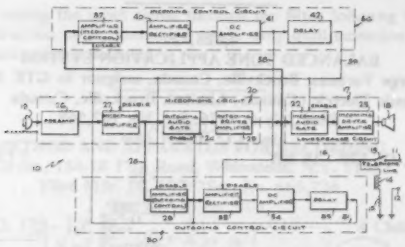
1. A speaker telephone having terminals for connection to a telephone line comprising:

a microphone connected via an outgoing audio gate circuit and an outgoing amplifier to the telephone line terminals,

a loudspeaker, said telephone line terminals being con-

nected via an incoming audio gate and an incoming amplifier to said loudspeaker,

an incoming control circuit, connected to receive audio incoming from said telephone line, for producing a first incoming control signal in response to said incoming audio, and for producing a second incoming control signal slightly delayed with respect to said first incoming control signal, and connected so that said second incoming control signal enables said incoming audio gate, and



an outgoing control circuit, responsive to audio from said microphone but disabled by said first incoming control signal, for producing an outgoing control signal in response to occurrence of audio from said microphone, and connected so that said outgoing control signal enables said outgoing audio gate and disables said incoming control circuit,

each of said incoming and outgoing control circuits producing its respective control signals only when not disabled by the disabling control signal from the other of said control circuits.

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**4,025,729**

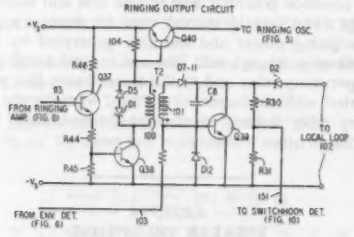
## TELEPHONE RINGING CONTROL CIRCUITS

**Dale Eugene Stone, Cedar Knolls, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Dec. 5, 1975, Ser. No. 638,162**

**Int. Cl.² H04M *1/26***

**U.S. Cl. 179—84 R** **6 Claims**




6. A switching circuit for high power signals comprising

a load for said signals,

a power source to operate said load,

a transistor switch connected in shunt with said source and said load, and

a constant current source derived independently of said power source connected to the control electrode of said transistor.

**4,025,730**

## IN-BAND SIGNAL RECEIVER

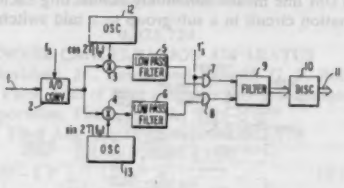
**Akira Sawai, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan**

**Filed Dec. 22, 1975, Ser. No. 642,822**

**Claims priority, application Japan, Dec. 23, 1974, 49-147772**

**Int. Cl.² H04M *1/50***

**U.S. Cl. 179—84 VF** **8 Claims**




1. A multifrequency signal receiver for an in-band audio frequency signalling system, comprising:

an analog-digital converter for converting an input in-band signal into a digital signal after sampling at a first sampling frequency;

oscillator means for generating a sine wave and a cosine wave, respectively, having a predetermined frequency at a center portion of the frequency arrangement of the multifrequency signals to be interposed within said band;

first and second multipliers for providing modulation products of the respective outputs of said oscillator means and the output of said analog-digital converter;

first and second low-pass filters connected to the respective outputs of said first and second multipliers and having cut-off frequencies preset so as not to affect any one of the multifrequency signals;

first and second sampling gate circuits for sampling the respective outputs of said first and second low-pass filters at a second sampling frequency having a value of an integral fraction of said first sampling frequency selected within the frequency range so that the multfrequency signal information may not be affected;

filtering means connected to the respective outputs of said first and second sampling gate circuits for deriving amplitude information possessed by each of the multifrequency signals from the output signals of said first and second sampling gate circuits; and

discriminating means for determining on the basis of the output of said filtering means which one of the multifrequency signals has arrived at the signal receiver.

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**4,025,731**

## OPTICAL RECORD, AND ASSOCIATED RECORDING AND READING-OUT DEVICES

**Michel Rembault, Paris, France, assignor to Thomson-CSF, Paris, France**

**Continuation of Ser. No. 245,431, April 19, 1972, abandoned. This application July 3, 1974, Ser. No. 485,714**

**Claims priority, application France, Apr. 20, 1971, 71.13917**

**Int. Cl.² G11B *7/18***

**U.S. Cl. 179—100.4 R** **15 Claims**

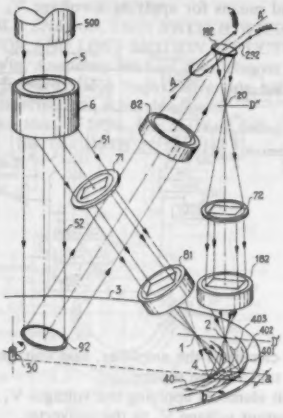
1. Record readable by means of a monochromatic beam of radiant energy and storing on a data carrier *p* signals within a single track of constant width, *p* being an integer at least equal to unity;

said signals exhibiting variations in instantaneous amplitude;

said data carrier having a non uniform optical characteristic, said characteristic defining fringes within said track, said fringes being directed along the axis of said track and

forming psuperimposed sets; and at least one of said fringes being continuous along said track;

each said set of fringes being respectively associated with each said signal and obeying a distinctive law of spacing along a direction perpendicular to the axis of said track, said law being variable along said axis and transcribing in said track said instantaneous amplitude;



said law of spacing being that of a set of interference fringes produced by two monochromatic light point sources arranged on a straight line parallel to the plane of said data carrier and perpendicular to the axis of said track; one of said point sources being fixed and the other vibrating along said straight line with an elongation proportional to said instantaneous amplitude.

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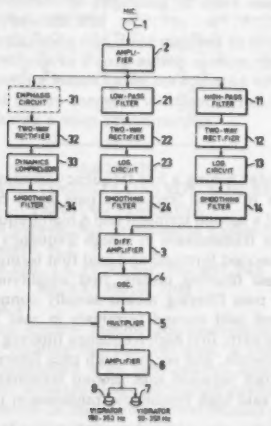
**4,025,732**

**METHOD AND DEVICE FOR PRESENTING INFORMATION TO DEAF PERSONS**

**Hartmut Traunmüller, 123 Bjornstigen, Solna, Sweden (S-171 72)**

**Filed July 22, 1976, Ser. No. 707,662**
**Claims priority, application Sweden, Aug. 4, 1975, 7508760**
**Int. Cl.² H04R *25/00***
**U.S. Cl. 179—107 FD** **4 Claims**



1. A method for presenting information obtained from an electroacoustic signal by means of bandfilters and a following signal treatment to deaf persons, via at least one tactile or auditive transducer, in which the relation between two signals corresponding to envelope potentials is derived, said signals being obtained from the electroacoustic signal by means of band filters with different frequency responses, and a signal corresponding to said relation being brought to continuously control the frequency of an oscillator, the ouput signal of which being amplitude modulated with a dynamic-adapting potential obtained from said electroacoustic signal and being used to drive at least one tactile or auditive transducer.

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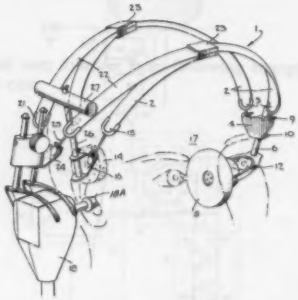
**4,025,733**

**PRESSURE SEAL HEADBAND**

**Irwin Klar, New City, and Erwin H. Rock, Dobbs Ferry, both of N.Y., assignors to American Electromedics Corporation, Dobbs Ferry, N.Y.**

**Filed Oct. 9, 1975, Ser. No. 621,057**
**Int. Cl.² H04M *1/05***
**U.S. Cl. 179—156 R** **11 Claims**



1. An improved head support for adjustably positioning a test probe tip in a patient's ear comprising the combination of:

a probe support for attachment to the patient's head;

A probe mounting positioned on the probe support;

a test probe having a probe tip positioned on said probe mounting;

said probe mounting including adjusting means for adjusting the insertion angle and level of the test probe tip and the pressure exerted by the test probe tip with respect to the patient's ear; and

said probe support and said probe pressure adjusting means each comprising resilient strap members.

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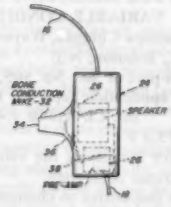
**4,025,734**

**AMBIENT NOISE SHIELDED EAR TRANSCEIVER**

**Harry Aloupis, 515 N. Pollard St., Arlington, Va. 22203**

**Filed July 27, 1976, Ser. No. 709,180**
**Int. Cl.² H04R *1/10, 1/46***
**U.S. Cl. 179—156 R** **7 Claims**



1. An ear transceiver assembly comprising:

a. a headphone housing adapted to be fitted over the ear of the user,

b. a speaker assembly contained in the housing and electri-

cally connected to the receiver circuitry of a transceiver unit,

c. a funnel-shaped open interior bone conduction microphone assembly contained in and connected to the headphone housing adjacent the speaker assembly and electrically connected to the transmitter circuitry in the transceiver unit, said microphone assembly projects into and firmly engages a portion of the auditory canal of the user and comprises both an electromechanical sensing element and a support element therefore, wherein said speaker assembly is mounted to supply its acoustic output through and unimpeded by said microphone assembly.

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**4,025,735**

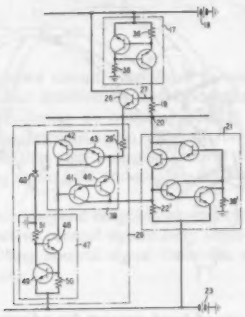
**NEGATIVE CONDUCTANCE NETWORK**

**Herbert Anton Schneider, Boulder, Colo., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Feb. 19, 1976, Ser. No. 659,501**

**Int. Cl.² H04B** *3/16*

**U.S. Cl. 179—170 G** **20 Claims**



1. In a communication system having at least one signal transmission circuit including at least first and second signal conductors, the improvement comprising a negative impedance network connected in shunt between those conductors and comprising

a first current source of fixed output current and connected to conduct current from the second conductor to a signal circuit terminal on said first conductor,

a second current source of controllable output current connected to conduct current from said first conductor terminal to said second conductor,

means for sensing changes in voltage at the signal circuit terminal, and

means, responsive to said sensing means, for supplementing current in said second current source for thereby modifying effects of said voltage changes.

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**4,025,736**

**APPARATUS FOR MEASURING THE VALUE OF A VARIABLE CONDITION**

**John Rudolph Matthew Chlupsa, Wayne, N.J., assignor to RFL Industries, Inc., Boonton, N.J.**

**Continuation-in-part of Ser. No. 505,315, Sept. 12, 1974, abandoned. This application Sept. 15, 1975, Ser. No. 613,339**

**Int. Cl.² H04B** *3/46*

**U.S. Cl. 179—175.3 F** **9 Claims**

1. Apparatus for measuring the value of a variable condition, which apparatus comprises,

a. a transducer responsive to changes in the variable condition and including a variable resistor having one end connected to a voltage source,

b. a pair of reversely-disposed diodes connected in parallel, said diodes being connected between the other end of said resistor and the voltage source,

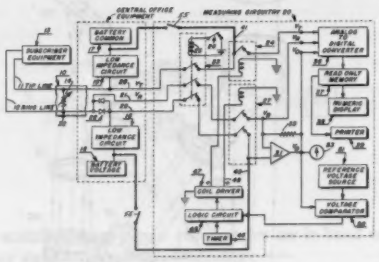
c. a high impedance amplifier having first and second input circuits and an output circuit,

d. a shunt resistor connected between the first input circuit of the amplifier and the output circuit,

e. an analog to digital converter,

f. first means for applying to the first input circuit of the amplifier the voltage $V_1$ appearing on the said other end of the transducer resistor,

g. second means for applying a voltage $V_2$ to the second



input circuit of the amplifier, said voltage being derived from said voltage source,

h. circuit elements applying the voltages $V_1$ and the amplifier output voltage $V_o$ to the converter,

i. third means for applying a voltage $V_3$ to said converter, said voltage being derived from said voltage source, said converter generating a digital output code corresponding to the ohmic value of the said variable resistor, and

j. means converting said output code to values of the variable condition.

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**4,025,737**

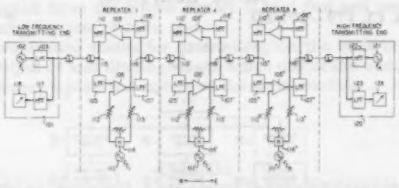
**REPEATER MONITORING AND FAULT LOCATION**

**Sherman Theodore Brewer, Little Silver, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Mar. 24, 1976, Ser. No. 669,857**

**Int. Cl.² H04B** *1/60*

**U.S. Cl. 179—175.31 R** **12 Claims**



1. A repeater having a low frequency transmission path for transmission in a low frequency pass band between a first terminal and a second terminal and a high frequency transmission path for transmission in a high frequency pass band between said second terminal and said first terminal comprising first low pass filtering means, first amplifying means, and second low pass filtering means serially connected between said first and said second terminals in said low frequency transmission path, first high frequency filtering means, second amplifying means, and second high pass filtering means serially connected between said second terminal and said first terminal in said high frequency transmission path characterized in that

said second low pass filtering means has a loss characteristic of a sufficiently low magnitude over a portion of said high frequency pass band to couple part of the output of said first amplifying means in said portion of said high fre-

quency pass band to said high frequency transmission path, and said second high pass filtering means has a loss characteristic of a sufficiently low magnitude over a portion of said low frequency pass band to couple part of the output of said second amplifying means in said portion of said low frequency pass band to said low frequency transmission path.

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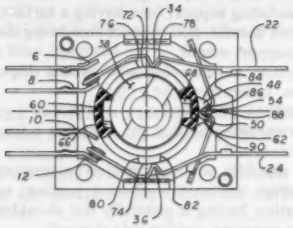
**4,025,738**

## REVERSIBLE SNAP-ACTION SWITCH WITH CAM OPERATOR AND LOST MOTION STRUCTURE

**Carl Lloyd Erwin, Anaheim; Michael John Howett, Fountain Valley, and Howard Hideo Nojiri, Riverside, all of Calif., assignors to Bourns, Inc., Riverside, Calif.**

**Filed Mar. 1, 1976, Ser. No. 662,649**
**Int. Cl.² H01H 21/38, 3/48**
**U.S. Cl. 200—6 B** **28 Claims**



1. A reversible snap-action switch, comprising:

a switch means,

an operating drive member,

a driven member having means to actuate said switch means, said driven member being movable through a switching zone in a given direction and in a direction reverse to said given direction to move said switch means respectively from a first to a second switching state and back to said first switching state,

lost motion means coupling said drive member in bidirectional driving relation with said driven member, said drive member being operable to drive said driven member through said switching zone in a given direction and thereafter to reverse its direction and drive said driven member back through said switching zone in the reverse direction, the relative position of said drive and driven members being shifted by substantially the lost motion distance between the beginning of drive movements in opposite directions, and

means for accelerating said drive member in said given and reverse directions in a snap-action motion, the action of said accelerating means being coordinated with the position of said driven member to effect switching in each direction during a snap-action motion.

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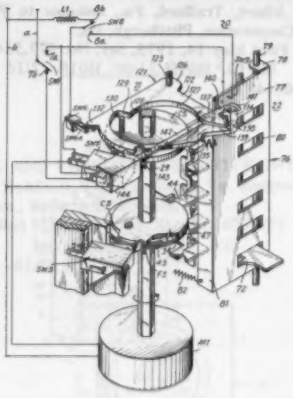
**4,025,739**

## SELECTION AND TIMING CONTROL FOR BEVERAGE VENDING MACHINE

**Leo Kull, West Caldwell, N.J., assignor to Coffee-Mat Corporation, Kenilworth, N.J.**

**Filed Feb. 13, 1976, Ser. No. 657,745**
**Int. Cl.² H01H 7/08**
**U.S. Cl. 200—38 F** **18 Claims**

1. An electrical control mechanism comprising a control cam, means for rotating said control cam, a cam follower movable into engagement with said control cam, a switch movable between actuated and deactuated positions in response to the position of said cam follower, means responsive to the actuation of said switch, and means releasably retaining said cam follower in a retracted position independently of the position of said control cam, said retaining means comprising a retaining cam engaging said cam follower and rockable about the axis of said control cam independently of the rotation of said control cam between positions retracting and



releasing said cam follower from following engagement with said control cam.

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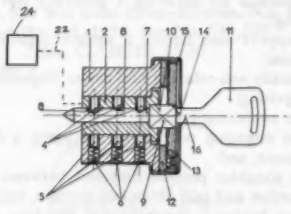
**4,025,740**

## ANTI-THEFT SAFETY DEVICE FOR AN AUTOMOBILE VEHICLE

**Paul Lipschutz, Croissy, France, assignor to Neiman, S.A., Courbevoie, France**

**Filed Apr. 9, 1976, Ser. No. 675,374**
**Claims priority, application France, May 2, 1975, 75.13893**
**Int. Cl.² H01H 27/06**
**U.S. Cl. 200—44** **9 Claims**



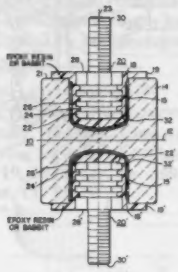
1. An anti-theft safety device for an automobile vehicle comprising a lock having a rotatable barrel cooperating with a key which has a cylindrical body and is provided with a driver of non-circular cross-sectional shape which cooperates with a cavity of complementary shape formed in the barrel, said barrel actuating, in the course of its rotation, means for locking at least one device essential for the operation of the vehicle and means for closing electric circuits, wherein there is provided a rotatable electric switch driven by cooperation of an opening of the switch with a driver, of complementary profile, on the key, the last-mentioned driver having sufficient length to continue to cooperate with said opening when the key has been partially extracted from the barrel and the driver for the barrel no longer drives the barrel.

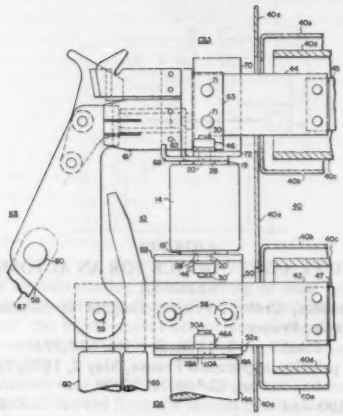
**4,025,741**

## INSERT DISPOSED IN STAND-OFF INSULATOR AND CIRCUIT INTERRUPTER INCLUDING SAME

**Willard S. Albert, Trafford, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed May 14, 1975, Ser. No. 577,514**
**Int. Cl.² H01H *31/00*; H01B *17/16***
**U.S. Cl. 200—48 R** **24 Claims**





1. Apparatus for securing a generally flat rigid member comprising:

a. a support base having a surface region with a recess therein;

b. generally non-relaxing stud means disposed in said recess, comprising:

1. an anchoring portion;

2. an engaging portion for engaging a force-providing means; and

3. a shoulder portion disposed between said engaging portion and said anchoring portion, said shoulder portion having a generally flat shoulder surface on the engaging portion side thereof;

c. anchoring material disposed in said recess and around said anchoring portion to a point on said stud means which is generally flush with said shoulder surface for generally affixing said stud means to said support base, said anchoring material having a relatively greater tendency to yield under mechanical stress than said stud means, said flat shoulder surface being disposed out of said recess beyond the level of said surface region of said support base; and

d. force-providing means disposed on said engaging portion for utilization in cooperation with said engaging portion to apply force against said generally flat rigid member to thereby generally fixedly secure said latter member to said stud means between said force-providing means and the combination of said flat shoulder surface and said flush anchoring material, mechanical stress caused by said force being thus directed generally against said shoulder surface of said non-relaxing stud means rather than said support base directly thus reducing the tendency of said anchoring material to physically yield under said force.

13. Circuit interrupter apparatus, comprising:

a. separable main contact means;

b. operating means interconnected with said separable main contact means for causing said separable main contact means to open and close under predetermined conditions;

c. support means supporting said separable main contact means; and

d. electrical insulator means for securing to said support means a generally flat rigid electrical conductor which is interconnected electrically with aid separable main contact means, comprising:

1. an insulating support base having a surface region with a recess therein, said support base being disposed upon said support means;

2. generally non-relaxing stud means disposed in said recess, comprising:

i. an anchoring portion;

ii. an engaging portion for engaging a force-providing means; and

iii. a shoulder portion disposed between said engaging portion and said anchoring portion, said shoulder portion having a generally flat shoulder surface on the engaging portion side thereof;

3. anchoring material disposed in said recess and around said anchoring portion to a point on said stud means which is generally flush with said shoulder surface for generally affixing said stud means to said insulating support base, said anchoring material having a relatively greater tendency to yield under mechanical stress than said stud means, said flat shoulder surface being disposed out of said recess beyond the level of said surface region of said support base; and

4. force-providing means disposed on said engaging portion for utilization in cooperation with said engaging portion to apply force against said generally flat rigid conductor to thereby generally fixedly secure said conductor to said stud between said force-providing means and the combination of said flat surface and said flush anchoring material, mechanical stress caused by said force being thus directed generally against said shoulder surface of said non-relaxing stud means rather than said support base directly thus reducing the tendency of said anchoring material to physically yield under said force.

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**4,025,742**

## POSITIVE MECHANICAL LOCK-OUT DEVICE

**Donald D. Ransom, Portland, Oreg., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.**

**Filed Aug. 6, 1975, Ser. No. 602,405**
**Int. Cl.² H01H *31/00***
**U.S. Cl. 200—48 R** **5 Claims**

1. In a lock-out arrangement to ensure sequential operation of a pair of switches in a first direction;

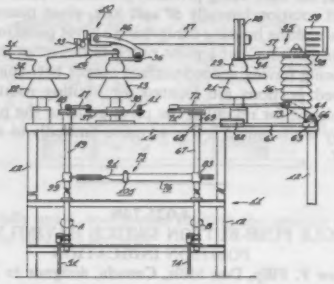
first and second interconnected members constructed and arranged for movement relative to each other;

said first member being a sleeve operably connected to move in a first direction with the operation of its associated switch in a first direction;

said second member being configured to slidably fit within said first sleeve member and operably connected to move in the first direction with the operation of its associated switch in the first direction; and,

a positive stop secured to one of said members and operable

to effectively prevent the movement of said members relative to each other in a first direction until the switch



which is to operate first in the sequence in the first direction has been operated.

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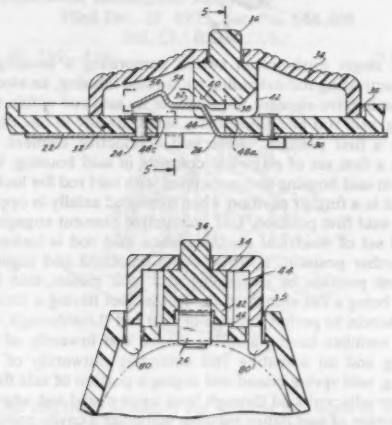
**4,025,743**

## THREE POSITION FLASHLIGHT SWITCH

**Anton H. Oswald, Wayne, N.J., assignor to Bright Star Industries, Inc., Clifton, N.J.**

**Filed Sept. 5, 1975, Ser. No. 610,550**
**Int. Cl.² H01H** *15/02, 9/02;* **F21V** *23/04*
**U.S. Cl. 200—60** **26 Claims**



**1.** A switch comprising a housing, a slide mounted on said housing for movement relative thereto in a first direction between first, second and third positions and a pushbutton mounted on said slide for movement with said slide in said first direction and movement relative to said slide in said second direction between normal and depressed positions, first and second contacts mounted on said housing, said second contact being movable between a first position wherein said contacts are operatively connected, said pushbutton and said second contact each having a first surface and a second surface generally inclined with respect to said first surface in a direction away from said second contact, said corresponding surfaces being out of alignment when said slide is in said first position whereby movement of said pushbutton toward its depressed position is ineffective to cause movement of said contact to its second position and said corresponding surfaces being aligned when said slide is in said second position to cause movement of said second contact to its second position when said pushbutton is in said depressed position, and second surfaces coacting, as said slide is moved from said second to said third position, to move said contact to its second position and said first surface to said pushbutton being effective to retain said second contact in its second position when said slide is in said third position.

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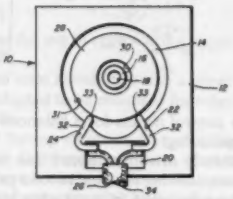
**4,025,744**

## SHOCK AND VIBRATION SENSITIVE SWITCH

**Leroy James Kniskern, Christiansburg, Va., assignor to Litton Systems, Inc., Beverly Hills, Calif.**

**Filed Mar. 29, 1976, Ser. No. 671,091**
**Int. Cl.² H01H** *35/14, 1/12*
**U.S. Cl. 200—61.45 R** **10 Claims**



**1.** A shock and vibration sensitive switch, comprising:
a toroidally shaped disc having an inner periphery and a conductive outer periphery;
a housing having side walls and a center post for contacting said inner periphery of said disc, wherein the contact therewith prevents said conductive outer periphery of said disc from contacting said housing side walls; and
a pair of contacts mounted in said housing for supporting said conductive outer periphery of said disc to close a circuit therebetween which opens when said switch is subjected to shock and vibration.

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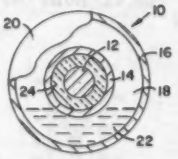
**4,025,745**

## CENTRIFUGAL SWITCHES

**Paul Kaufman, 880 Red Oaks Drive, Elberon, N.J. 07740**

**Filed Dec. 15, 1975, Ser. No. 640,509**
**Int. Cl.² H01H** *35/10*
**U.S. Cl. 200—80 A** **2 Claims**

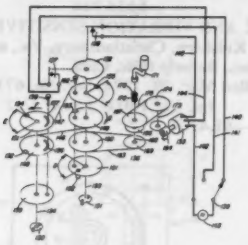


**1.** A centrifugal switch disposed for use in making or breaking a circuit comprising a pair of electrical contact members in spaced relationship to each other, said members being concentric metallic rings of different diameters, a cylindrical chamber provided between said rings; electrical insulation provided on the interior of the smallest diameter metallic ring for insulation mounting of said switch; a liquid for conducting electrical current between said electrical contact members, said liquid being mercury and disposed for displacement from a first static position to a second position for making or breaking said circuit responsive to rotation of said switch.

## 4,025,746
## REMOTE CONTROL MEANS FOR A BALANCED LINE SWITCH SYSTEM

Kenneth Owen, 6201 Hibbling Ave., Springfield, Va. 22150

Division of Ser. No. 457,615, April 3, 1974, Pat. No. 3,885,117. This application Jan. 31, 1975, Ser. No. 545,949
Int. Cl.² H01H 67/00
U.S. Cl. 200—179 9 Claims



1. Remote control means for a balanced line switch system said means including:

a. intermittently driven balanced line main switch means, said means defining first and second pairs of balanced line conductors arranged in a crossbar matrix and a pair of rotatable means arranged between said balanced line conductors, each of said rotatable means having identical helix portions defining 90° of rotation, each of said rotatable means being intermittently rotatable through 90° of rotation,

b. drive means for rotating said pair of rotatable means through 90° of rotation in response to a first circuit application and reversing said rotation in response to a second circuit application,

c. cam means mounted on one of said rotatable means for actuating a first and second control switch means,

d. three-way switch means interconnected with said first and second control switch means to effect a first field application to said drive means while in a first position and a second field application to said drive means when in a second position.

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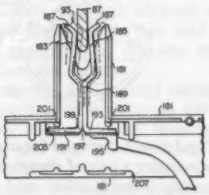
## 4,025,747
## CIRCUIT INTERRUPTER STAB ASSEMBLY WITH SELF-ALIGNING CLIP TYPE CONTACT

Brij M. Bharteey, Bolingbrook, and Neal E. Rowe, Oak Forest, both of Ill., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 11, 1975, Ser. No. 612,604
Int. Cl.² H01H 1/42
U.S. Cl. 200—254 5 Claims



1. A circuit interrupter for use in drawout switchgear and comprising a stationary housing having stationary bus bars, a circuit breaker in the housing and comprising spaced terminals, the terminals being movable into and out of contact with the bus bars when the circuit breaker is moved into and out of the housing, each terminal comprising a base and a pair of outturned flexible contacts disposed on opposite sides of an axis and engageable with opposite sides of a bus bar, the base comprising oppositely outturned portions extending from the sides of the axis, a dielectric housing for at least the outturned portions, the base being pivotally mounted within the housing to effect rotation laterally of said axis, pivot means between the base and the housing comprising a pivot point in one of the base and housing and a pivot notch in the other thereof, and the housing having spaced surface means between which the outturned portions are located for limiting rotation of the terminal and for retaining the pivot point in the pivot notch, whereby the terminal is free to move limitedly to align with a bus bar.

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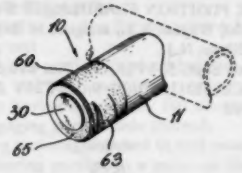
## 4,025,748
## SINGLE PUSH-BUTTON SWITCH HAVING VISUAL POSITION INDICATION

Stanislaw F. Filip, Don Mills, Canada, assignor to I.C.S. Ignition Control Systems Ltd., Montreal, Canada

Filed July 17, 1975, Ser. No. 596,846
Int. Cl.² H01H 13/08
U.S. Cl. 200—308 8 Claims




1. A single push-button switch comprising a housing, a switch activating rod extending within said housing, an electrically conductive element displaceable by said rod within said housing, said rod being resiliently biased axially in one direction to a first position where said conductive element will engage a first set of electrical contacts in said housing, lock means in said housing and associated with said rod for locking said rod in a further position when displaced axially in opposition to said first position, said conductive element engaging a second set of electrical contacts when said rod is locked in said further position, said rod being unlocked and urged to said first position by depressing said lock means, said lock means being a flat elongated flange member having a through bore therein to permit passage of said rod therethrough, said flange member having a spring biased end inwardly of said housing and an actuating end extending outwardly of said housing, said spring biased end urging a portion of said flange member adjacent said through bore against said rod whereby said portion of said flange member will enter a cavity provided in at least a portion of said rod when in planar alignment therewith to maintain said rod in said further position, said flat elongated flange member having finger engagement means at an actuating end thereof and extending to a side of a finger engaging end of said rod to permit unlocking of said rod by depressing said actuating end.

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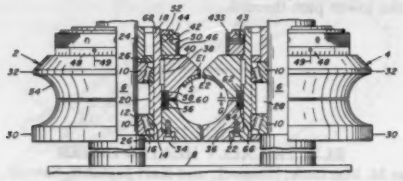
## 4,025,749
## APPARATUS FOR MAKING BUTT-WELDED TUBES

Eugene V. Spurr, Wallingford, and Edward S. Kedzior, Northford, both of Conn., assignors to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Filed Mar. 25, 1976, Ser. No. 670,287
Int. Cl.² B23K 11/06
U.S. Cl. 219—84 11 Claims

1. Apparatus for confining an elongated strip bent into tubular shape with its longitudinal edge separated to form a slot therebetween comprising a pair or rolls each having a peripheral groove therein for receiving substantially half of said bent strip with its slot adjacent the outer pheripery of said groove; at least one of said rolls including a shaft, a pair

of roll sections each including a portion of said peripheral groove mounted on said shaft, resilient means biasing said roll



sections axially apart, and means limiting the amount of said movement of said roll sections.

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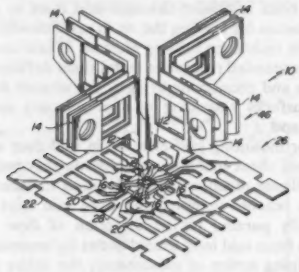
**4,025,750**

## COMPLIANT ELECTRODE

**Alan S. Keizer, Huntingdon Valley; Hans Strube, Holland, and Harold Stewart, Hatboro, all of Pa., assignors to The Jade Corporation, Huntingdon Valley, Pa.**

**Filed Dec. 29, 1975, Ser. No. 644,409**
**Int. Cl.² B23K *35/02***
**U.S. Cl. 219—119** **7 Claims**



1. An electrode assembly for welding the leads of a semiconductor chip to an outer lead frame comprising:

a gross electrode having an extended planar surface adapted to contact one side of a workpiece comprising the leads of a semiconductor chip and an outer lead frame;

a plurality of spot electrodes adapted to contact the opposite side of said workpiece at spaced points; and

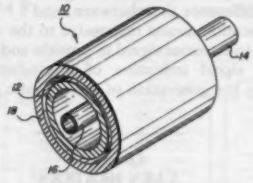
support means for supporting said spot electrodes in spaced relation, said support means including a housing and a plurality of metallic parallelogram support members, the major face of each of said support members lying in a plane perpendicular to the planar surface of said gross electrode, each of said plurality of parallelogram support member including a first leg fixedly attached to said housing and a second leg supporting a different one of said spot electrodes, each of said parallelogram support members being resiliently deformable and each of said second legs being displaceable in a plane perpendicular to the planar surface of said gross electrode when the electrode supported thereby is biased against said workpiece whereby each said electrode is responsive to dimensional changes in said workpiece and constant contact is maintained between said workpiece and said spot electrodes during the entire welding operation.

**4,025,751**

## FUSER ROLL SLEEVE

**Bertsel O. Wright, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Apr. 28, 1975, Ser. No. 572,695**
**Int. Cl.² H05B *1/00*; G03G *15/20***
**U.S. Cl. 219—216** **3 Claims**



1. Fuser apparatus for use in reproducing apparatus, including:

an elongated rigid core member having a generally circular cross section adapted to be mounted for rotation about its longitudinal axis;

a sleeve member having an inside diameter slightly greater than the outside diameter of said core when the temperature of said sleeve is elevated above the operational temperature of said fuser apparatus and/or the core is chilled below ambient temperature and wherein the outer surface of said rigid core securely engages the inner surface of said sleeve when the sleeve-core assembly is at or below operating temperature and

means for elevating the temperature of said sleeve member whereby toner images supported on substrates are softened when they are contacted by said sleeve.

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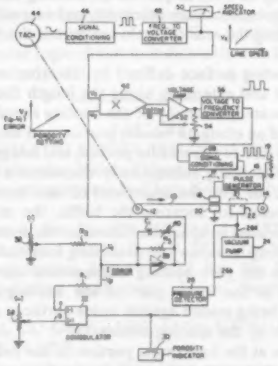
**4,025,752**

## APPARATUS FOR ELECTRICALLY PERFORATING DIELECTRIC WEBS

**Hobart A. Whitman, III, Asheville, N.C., assignor to Olin Corporation, Pisgah Forest, N.C.**

**Filed May 25, 1976, Ser. No. 689,834**
**Int. Cl.² H05B *7/18***
**U.S. Cl. 219—384** **10 Claims**



1. Apparatus for controlling the porosity of a web of sheet material by applying a series of periodic electrical signals to a set of electrodes past which the web is directed and perforated thereby, said porosity controlling apparatus comprising:

a. controllable means for generating and applying a series of

periodic pulses to the set of electrodes to effect a corresponding series of periodic discharges through the web;
b. means responsive to web movement for providing a web velocity signal;
c. means for setting a reference output indicative of the desired porosity of the web;
d. means responsive to the reference output and the measured web porosity for providing an error signal indicative of the difference therebetween; and
e. multiplication means responsive to the web velocity signal and to the error signal to provide and apply a product, control signal indicative of a product therebetween, whereby the generation of the periodic pulses is so controlled.

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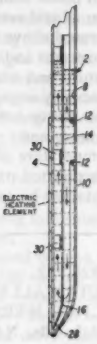
**4,025,753**
**YARN HEATERS**
**Geoffrey Robert Bennet, Fleckney, England, assignor to Heating Elements Limited, England**
**Filed June 2, 1975, Ser. No. 582,934**
**Claims priority, application United Kingdom, June 4, 1974, 24742/74**
**Int. Cl.² H05B** *1/00;* **D02J** *13/00;* **F26B** *13/02;* **F27B** *9/28*
**U.S. Cl. 219—388** **3 Claims**




1. Yarn heater including a single elongate, hollow metal yarn heating member having a substantially constant internal cross-section;
a flat, plate-like electric yarn heating element mounted externally at a lower part of the heating member in heat exchange relationship therewith and extending longitudinally along the rear of the lower part of the heating member;
a yarn heating surface defined by the front of the heating member and extending along the length thereof;
a baffle located internally of the heating member and comprised of an elongate middle portion and elongate flanges on each side of the middle portion and integral therewith, said baffle being substantially coextensive at the upper end thereof with the upper end of said heating element;
spacing means for locating the baffle, the middle portion being located in spaced relation to the front and rear of the heating member and extending longitudinally therein between the yarn heating element and the yarn heating surface in the lower part of the heating member, the flanges being seated against inside surfaces of the heating member by the spacing means;
and means at the lowermost portion of the heating member for defining a restrictive opening for fluid communication between the front and rear of the heating member;
the heating member being filled with heating fluid which consists of when heated a liquid phase and a vapor phase above the liquid phase, the liquid phase having a level at least as high as the top of the yarn heating element and being in heat exchange relationship with the yarn heating element to the rear of the baffle, and with the front of the lower part of the heating member to the front of the baffle, and the vapor phase being in a heat exchange relationship with the front of the heating member above the lower part thereof.

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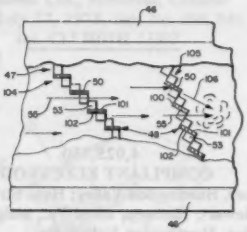
**4,025,754**
**ELECTRICALLY HEATED DRYER**
**James M. Marzonie, Hancock, and Karl Jautakis, Sawyer, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.**
**Filed June 16, 1975, Ser. No. 587,436**
**Int. Cl.² F26B** *11/00;* **H05B** *3/02;* **H01C** *3/10;* **F24H** *3/04*
**U.S. Cl. 219—400** **3 Claims**




1. In a dryer having a container for removably containing articles to be dried, a duct having an outlet communicating with said container, and an inlet, and means for delivering an air stream from said inlet through said duct to said outlet, improved means for heating the air in said stream comprising:
an electric resistance heating element in said duct comprising an expanded resistance metal sheet defining separated strands and connecting bridges, the strands defining parallel surfaces extending at a preselected angle to said sheet; and
means for mounting said element in said duct serpentinely with said sheet spanning said duct in successive substantially planar reaches with said strand surfaces of the upstream reaches commencing from said inlet being substantially parallel to the direction of flow of said air stream from said inlet to said outlet for essentially streamline wiping action of substantially the entire area of said surfaces by said air stream, said sheet further including a substantially planar reach downstream of said upstream reaches spanning said duct with said strand surfaces thereof being substantially non-parallel to said direction of flow of said air stream.

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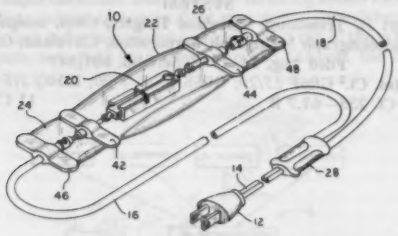
**4,025,755**
**THERMOSTATIC ELECTRIC CABLE HEATER**
**John W. Shirley, and James V. DePhillips, both of Chicago, Ill., assignors to Wrap-On Company, Inc., Chicago, Ill.**
**Filed Nov. 11, 1975, Ser. No. 630,766**
**Int. Cl.² H05B** *3/56*
**U.S. Cl. 219—549** **5 Claims**

1. An electrical heating cable device, comprising:
thin, flexible, elongated, electrically conductive, resistance heating elements embedded in flexible insulators;
a thermostat, for controlling energization of the heating elements, enclosed in an insulated thermostat envelope and connected to the heating elements by insulated, low resistance electrical conductors, said heating elements being entirely outside of the thermostat envelope; and

additional insulating envelope means for enclosing the




points of attachment between the low resistance electrical conductors and the ends of the heating elements.

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**4,025,756**

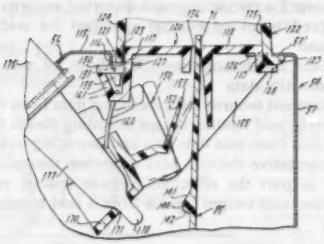
## TOY CASH REGISTER

**James E. Thomson, Pleasant Lake, Mich., assignor to Western Stamping Corporation, Jackson, Mich.**

**Division of Ser. No. 501,166, Aug. 28, 1974, Pat. No. 3,957,198. This application Apr. 26, 1976, Ser. No. 680,038**

**Int. Cl.² G07G *1/00*; G06C *27/00***

**U.S. Cl. 235—1 E** **8 Claims**



**1.** In a toy cash register having a supporting structure, a plurality of vertically slidable indicator targets, a plurality of key means for individually raising the targets, and means for releasably holding the indicator targets in raised position, characterized by the combination which comprises an abutment portion on each target, a target latch member rockably mounted in the supporting structure, a plurality of fingers on the latch member individually aligned with the paths of movement of corresponding ones of the abutment portions on the targets, each finger being inclined upwardly and angularly toward its corresponding target and having a free upper end which is movable toward and away from a position corresponding to underlying relation to the abutment of the corresponding raised target in response to rocking movement of the latch member, each of said fingers being stiff enough in a vertical direction to support a target when underengaged with the corresponding abutment, and yieldable enough in a horizontal direction away from the target to flex away from its target far enough to permit the abutment of a target which is being raised to pass the same without thereby transmitting enough torque to the latch member to rock other fingers away from underlying relation to other raised targets.

**4,025,757**

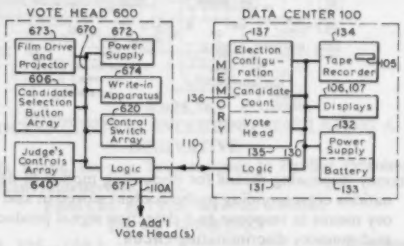
## VOTING SYSTEM

**Richard H. McKay, Oak Brook, Ill.; William R. Smith, Morristown, N.J., and Herman Deutsch, Raleigh, N.C., assignors to Video Voter Inc., Chicago, Ill.**

**Continuation-in-part of Ser. No. 543,322, Jan. 23, 1975. This application Feb. 26, 1976, Ser. No. 661,836**

**Int. Cl.² G07C *13/00***

**U.S. Cl. 235—54 F** **21 Claims**




**7.** A vote entry and recording system for storing information regarding candidates and races for successive presentation to a voter, comprising:

a vote head including an optical unit for visually displaying the candidates in each race, including a plurality of vote selectors for indicating the candidate selected in a given race, and a vote head logic circuit connected to the plurality of vote selectors; and

a data center, coupled to the vote head by first and a second conductor pairs, including an election configuration memory for storing processing instructions, a candidate count memory connected to receive and accumulate the total of votes in each race cast at the vote head, a vote head memory, coupled between the first conductor pair and the candidate count memory, for continually representing the status of the vote selectors in the vote head, and a data center logic circuit coupled to the first conductor pair and to all the memories, which data center logic circuit includes a clock circuit connected to generate a train of pulses for passage over the second conductor pair to the vote head for use in continually scanning the plurality of vote selectors in the vote head, said vote head logic means being connected to change the representation of at least one pulse in the pulse train each time a vote selector is actuated, thus producing a modified pulse train which is returned over the first conductor pair to the data center logic circuit to indicate the candidate selected at the vote head.

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**4,025,758**

## AUTOMATIC MONEY-ISSUING APPARATUS

**Yoshihiro Hatanaka; Hideto Shigemori, and Akio Ueba, all of Himeji, Japan, assignors to Glory Kogyo Kabushiki Kaisha, Japan**

**Continuation of Ser. No. 406,869, Oct. 16, 1973, which is a division of Ser. No. 179,045, Sept. 9, 1971, Pat. No. 3,784,790. This application July 10, 1975, Ser. No. 594,695**

**Claims priority, application Japan, Sept. 11, 1970, 45-79763**

**Int. Cl.² G06K *15/00*, *15/06*; G07F *11/00***

**U.S. Cl. 235—61.7 R** **1 Claim**

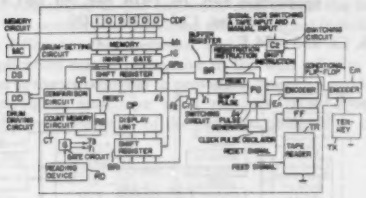
**1.** An automatic money dispensing apparatus for automatically dispensing a specified amount of money, which comprises:

input means for inputing data on the amount of money to be dispensed;

memory means for storing the data from said input means;

a memory discriminating circuit for discriminating the content of said memory means, said discriminating circuit

comprising a first detection circuit for detecting that the content of the memory means is zero, and a second detection circuit for detecting that the content of the memory means is a predetermined amount other than zero; and



money dispensing means for dispensing money in denominations corresponding to the content stored in said memory means in response to a detection signal produced by said memory discriminating circuit.

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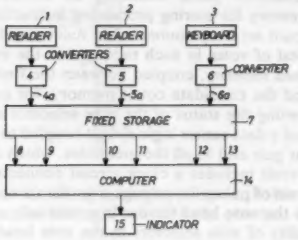
## 4,025,759
## CHECKING APPARATUS FOR DOCUMENTS

**Kurt M. Scheffel, Weil am Rhine, Germany, assignor to The Grey Lab. Establishment, Liechtenstein**

**Filed Oct. 16, 1975, Ser. No. 622,868**
**Int. Cl.² G06K 7/10; B42D 15/00; G06K 19/06**
**U.S. Cl. 235—61.7 B** **5 Claims**

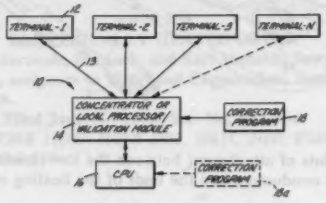



1. An apparatus for the selective determination of at least any one of the identity of a document formed as a data carrier, the identity of the proper user of the document, or both, comprising reading devices for automatically reading automatically readable data applied to the document, keyboard means for the infeed of a secret number, an evaluation circuit, said evaluation circuit possessing fixed storage means in which there are stored constant data and data processing programs, access circuit means for selectively evaluation any one of parts of the automatically readable data of the document, the secret number introduced via the keyboard means, or both, in the form of select addresses, computer means which through utilization of the selected constant data and data processing programs processes the selected constant data into a result, and means for the indication of said result, the improvement wherein the document embodies a document carrier containing characteristic data, one of the reading devices serves for the determination of the characteristic data of the document carrier and includes a mask possessing a number of measurement regions, the individual measurement regions are separated from one another by non-sensitive partition webs of a width essentially corresponding to at least one means incorporated into the document carrier, and circuit means for logically coupling two successively carried out measurement operations while displacing the mask through a distance corresponding to the width of a web.

## 4,025,760
## SECURITY MEANS FOR TRANSACTION TERMINAL SYSTEM

**Robert H. Trenkamp, Cleveland Heights, Ohio, assignor to Addressograph Multigraph Corporation, Cleveland, Ohio**

**Filed Aug. 14, 1975, Ser. No. 601,947**
**Int. Cl.² G06F 15/20; G06K 9/08, 7/00; H04Q 2/54**
**U.S. Cl. 235—61.7 B** **11 Claims**




1. A transaction terminal system comprising:
data processing means,
a plurality of remote data capture terminals, each said terminal including:
data input means for receiving data including account identification data and associated security data, each said data input means including means for distorting said security data such that the distortions vary among said terminals for the same said received security data,
said data input means including means for reading security data from a document whereby the validity determination is representative of the authenticity of the presented document,
means for generating terminal identification data,
means for transmitting said terminal identification data, account identification data, and distorted security data to said data processing means,
said data processing means including:
means for correcting said distorted security data in a predetermined manner specified for said terminal, and
means for determining the validity of said corrected security data.
said document security data including data from at least two data sets, said reading means including means for reading said data from said data sets and providing output signals representative thereof, said distortion means defining at least in part the effective time or spacial relationship between said output signals from a said terminal.

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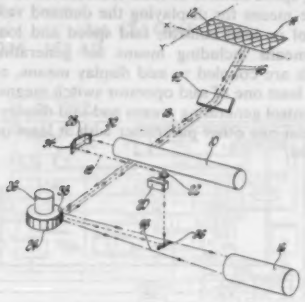
## 4,025,761
## OPTICAL SYSTEM FOR CODE SYMBOL SCANNERS

**Thomas David Hayosh, Bloomfield Hills, and John Henry Carosella, Avon Township, both of Mich., assignors to Schiller Industries, Inc., Cullman, Ala.**

**Continuation-in-part of Ser. No. 568,808, April 16, 1975, which is a continuation-in-part of Ser. No. 466,769, May 3, 1974, abandoned. This application Oct. 6, 1975, Ser. No. 619,991**
**Int. Cl.² G06K 7/14, 9/12; G02B 27/17**
**U.S. Cl. 235—61.11 E** **6 Claims**

1. An optical scanner for reading bar code symbols comprising, a scanning window adapted to receive a code symbol, a transmitted light beam path, a light beam source at the origin of the beam path for producing a light beam, first and second deflector means disposed serially in the light beam path for cyclically deflecting the beam along major and minor deflection axes respectively and for directing it onto the window, a return light path, a light receiving means at the terminus of the return light path, said code symbol adjacent said window being at the terminus of said light beam path and at the origin of the return light path, said return light path including said first deflector means whereby the image of said symbol repre-

sented by the return light from said symbol has no component of motion at the receiving means in a direction corresponding to the major deflection axis, said light receiving means including a light collecting lens, a field stop and a photodetector, said second deflection means being disposed out of the return light path, said field stop being disposed between the light



collecting lens and the photodetector, said field stop defining a slit extending in a direction corresponding to said minor deflection axis whereby the slit passes to the photodetector only that portion of the return light which originates in a narrow band which extends along the minor axis at a position on the major axis where the light beam is impinging upon the code symbol.

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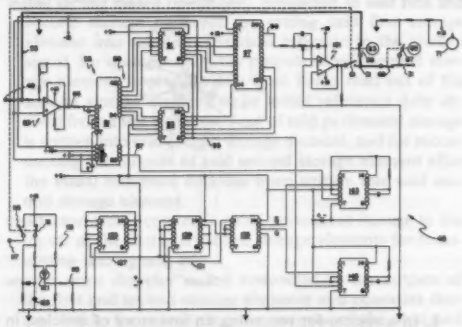
**4,025,762**

## REFERENCE SIGNAL CIRCUIT

**Anthony J. Rossi, Fitchburg, and Donald F. Behringer, Ashburnham, both of Mass., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Nov. 21, 1975, Ser. No. 634,138**
**Int. Cl.² G05B 9/03**
**U.S. Cl. 235—150.1** **9 Claims**



1. In a prime mover control system, a reference signal is input into the control system through a reference signal circuit, the reference signal circuit including a signal storage means; the reference signal circuit having an input end connected to a reference signal generator and an output end connected to the control system; the output end following the input end except when the input end becomes invalid whereupon the output end follows the signal storage means, the reference signal circuit comprising:

a first signal channel connected to the input end of the reference signal circuit;

a second alternate signal channel, including the signal storage means, connected to the input end of the reference signal circuit;

signal update means connected to the signal storage means for providing a storage input update signal and a storage output update signal, the input update signal and the output update signal having a time lag therebetween; and,

switching means connected to the first and second channels and to the signal update means; the switching means connecting the first channel to the reference signal circuit output end except when the input end becomes invalid whereupon the switching means connects the second channel to the reference signal circuit output end and interrupts the signal update means whereby the reference signal circuit output end follows the last output of the signal storage means.

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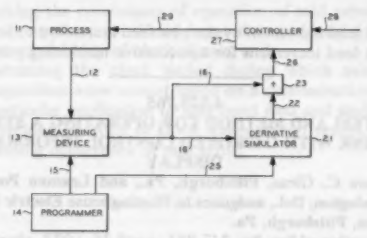
**4,025,763**

## PROCESS CONTROL INCLUDING SIMULATING A DERIVATIVE

**Louis D. Kleiss, Borger, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Oct. 6, 1975, Ser. No. 620,081**
**Int. Cl.² G05B 6/02**
**U.S. Cl. 235—150.1** **23 Claims**




1. A method for controlling a process in response to a process signal which is incrementally altered at successive time intervals, said method comprising:

maintaining a first signal representative of the value of said process signal during the present interval;

maintaining a second signal representative of the value of said process signal during the immediately preceding interval;

generating, in response to said first signal and said second signal, a simulated derivative signal responsive to the magnitude and direction of the difference between said first signal and said second signal;

generating a third signal by combining said first signal and said simulated derivative signal to produce said third signal;

utilizing said third signal as an input to a process control means; and

controlling said process in response to an output of said process control means.

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**4,025,764**

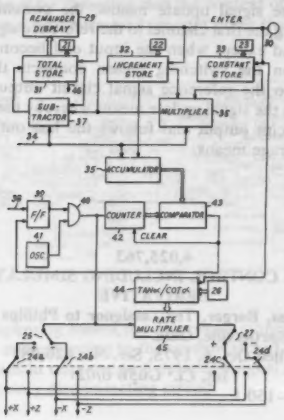
## MULTI PASS MACHINING WITH CONTROL OF FEED INCREMENTS

**Alfred Tack, 19 Sinfin Moor Lane, Chellaston, Derby, England**

**Filed Mar. 17, 1976, Ser. No. 667,873**
**Int. Cl.² B23F 1/00**
**U.S. Cl. 235—151.11** **5 Claims**

1. In a machine tool control system of the type wherein repeated machining passes are effected with progressively reducing increments of in-feed, the improvement comprising means for storing the current feed increment, means for storing a modifying constant, and computing means operative to form a predetermined mathematical combination of the

stored feed increment and modifying constant such as to form a new, smaller feed increment, and to replace the stored current feed increment by the new feed increment to form the current feed increment for a successive machining pass.

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**4,025,765**

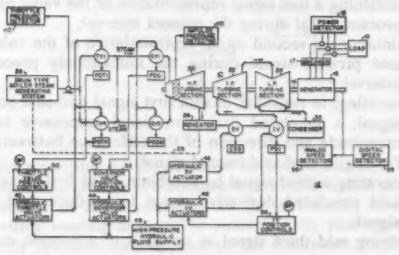
## SYSTEM AND METHOD FOR OPERATING A STEAM TURBINE WITH IMPROVED CONTROL INFORMATION DISPLAY

**Theodore C. Giras, Pittsburgh, Pa., and Leaman Podolsky, Wilmington, Del., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 247,881, April 26, 1972, abandoned. This application Aug. 10, 1973, Ser. No. 387,578**

**Int. Cl.² G05B *15/00*; G06F *15/06, 15/56***

**U.S. Cl. 235—151.21** **13 Claims**



**1. A control system for a large electric power steam turbine having a plurality of turbine sections to which steam is supplied through at least one throttle valve and a plurality of governor valves, said control system comprising means for electrohydraulically controlling the position of the throttle and governor valves, means for generating signals representative of the valve positions, means for generating signals representative of the turbine speed and the turbine impulse pressure, means for generating signals for application to said electrohydraulic controlling means to position the valves for speed control during startup in accordance with a predetermined characterization having a plurality of system parameters including a speed reference associated with it, means for generating signals for application to said electrohydraulic controlling means to position the valves for load control after synchronization in accordance with another predetermined characterization having a plurality of other system parameters including a load reference associated with it, said speed and load control generating means including means for generating respective speed and load demands from the speed and load references, an operator panel having a plurality of operator switch means to enable the operator to select the control system operating mode and the operating status of or value of or a display of other predetermined variables, said operator panel further including first means for displaying the reference value during speed control or load control and at least a second separate means for displaying the demand value during speed control or load control, said speed and load control generating means including means for generating display signals which are coupled to said display means, and means including at least one of said operator switch means for operating said control generating means and said display means to display at least one other parameter with at least one of said display means.**

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**4,025,766**

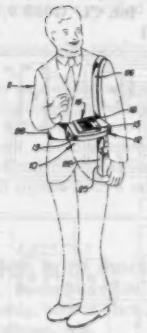
## INVENTORY RECORDATION SYSTEM AND PROCESSING

**Joseph Sau-Ho Ng, Montebello, and William S. Sommers, Pasadena, both of Calif., assignors to Muscolino Inventory Service, Inc., Arcadia, Calif.**

**Filed Oct. 29, 1975, Ser. No. 626,770**

**Int. Cl.² G06K *7/14*; G06F *7/02***

**U.S. Cl. 235—152** **12 Claims**



**1. In a system for recording an inventory of articles, in an article storage area, the combination comprising**

**a. a platform sized to be attached to an inventory taker moving about the article storage area,**

**b. instrumentation including an alphanumeric keyboard unit, calculator and display supported on the platform,**

**c. a digital data recorder operatively connected to the keyboard unit, and means to support the recorder on the inventory taker, and**

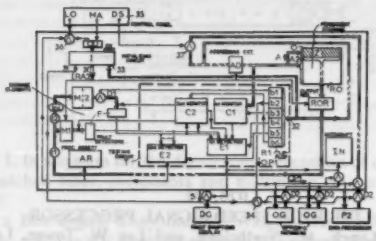
**d. the keyboard unit including alpha and numerical keyboards and arithmetic function keys, and there being circuitry including two additional keys the first of which is operable when manually selected to enable recordation by the recorder of the keyboard output and to disable the calculator connection to the recorder, and the second of which is operable when manually selected to interconnect the calculator and the recorder.**

## 4,025,767

## TESTING SYSTEM FOR A DATA PROCESSING UNIT

Gilles Jean Marcel Bottard, Paris, France, assignor to Compagnie Honeywell Bull (Societe Anonyme), Paris, France

Continuation of Ser. No. 450,936, March 13, 1974, abandoned. This application Feb. 4, 1976, Ser. No. 655,244
Claims priority, application France, Mar. 16, 1973, 73.09558
Int. Cl.² G06F *11/00*
U.S. Cl. 235—153 AC 14 Claims



1. In a data-processing system including first and second data-processing units, optional members and switch means for connecting said first data-processing unit to said second data-processing unit and to said optional members, said first data-processing unit comprising a permanent storage containing a sequence of test signals, a first storage element and a second storage element each including bistable components respectively settable and non-settable into predetermined initial states, improved apparatus incorporated into said first data-processing unit for setting the states of the storage elements and for responding to the data read out of the storage elements, comprising:

first error detector means operative during data processing for generating a control signal in response to the transmission of erroneous data from the first or second storage elements;

initial setting means operatively connected to said first and second storage elements for setting said first storage element into said initial state in response to the control signal, for disconnecting the outputs of said second storage element to prevent data from being read out of the second storage element while initial reference data derived from a test signal read out of said permanent storage is written into said second storage element, and for reconnecting the outputs of said second storage element after the initial reference data has been written into said second storage element;

conductor means connecting said permanent storage to the inputs of the first and second storage elements for transmitting test signals; and

second error detector means connected to the outputs of the first and second storage elements and operative during testing for monitoring the outputs of the first and second storage elements as the test signals are conducted to the conductor means and for generating a validating signal in response to the detection of an error, so that a fault detected during testing can be identified.

## 4,025,768

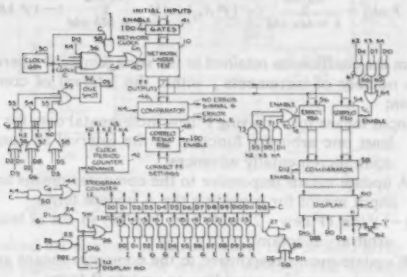
## METHOD AND APPARATUS FOR TESTING AND DIAGNOSING DATA PROCESSING CIRCUITRY

Michael Herodotus Missios, Mission Viejo, and John Richard Werner, Orange, both of Calif., assignors to Burroughs Corporation, Detroit, Mich.

Filed May 24, 1976, Ser. No. 689,368
Int. Cl.² G06F *11/00*
U.S. Cl. 235—153 AC 14 Claims

1. In an automatically performable, electronically implemented method of testing a network exhibiting a time-dependent error and constructed and arranged for operation in response to applied clock signals, the steps of:

repeatedly applying input data and a predetermined plurality of clock signals to said network with a different clock period being extended for each application of said input data and said predetermined plurality of clock signals, the amount of each extension being chosen to prevent occurrence of a time-dependent error if it occurs during that clock period;



checking the correctness of operation of said network for each application of said input data and said predetermined plurality of clock signals; and

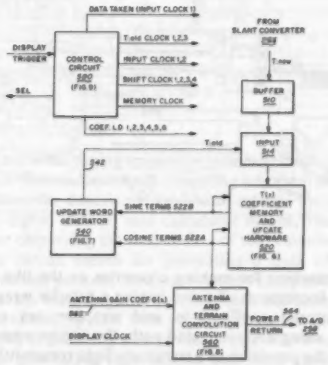
determining the clock period during which said time-dependent error occurs based on a determination of the particular application of said input data and said predetermined plurality of clock pulses which results in preventing occurrence of said error.

## 4,025,769

## APPARATUS FOR CONVOLUTING COMPLEX FUNCTIONS EXPRESSED AS FOURIER SERIES

Robert E. Simpson, Santa Clara, and Evor Silvio Vattuone, San Jose, both of Calif., assignors to The Singer Company, Binghamton, N.Y.

Filed July 7, 1975, Ser. No. 593,348
Int. Cl.² G06F *15/34*
U.S. Cl. 235—156 19 Claims



1. Apparatus for continuously convoluting at least two functions F1($x$) and F2($x$), at least one function of which is arbitrary, in response to F:new incremental data for the at least one arbitrary function, throughout an interval of consideration which incrementally advances along the at least one arbitrary function, comprising:

storage means for retaining the $Na$ plus $Nb$ coefficients of the Fourier series:

$$F(x)j = \sum_{k=Ma}^{Na} (A_{k_j} \cos kx) + \sum_{k=Mb}^{Nb} (B_{k_j} \sin kx)$$

for each function over the interval of consideration wherein $j$ represents the incremental advancement;

computer means for providing the entity:

$$F{:}oldj = \sum_{k=Ma:old}^{Na:old} (-1)^k A_{k_j} + \pi/M \sum_{k=Mb:old}^{Nb:old} (-1)^k kB_{k_j}$$

from the coefficients retained in the storage means where M is the number of increments $j$ within the interval of consideration;

input means for receiving F:new incremental data for the at least one arbitrary function as the interval of consideration incrementally advances;

A update means responsive to the computer means and the input means for providing the A update term:

$(-1)^n/n\pi$ (F:new - 2F:old) (sin $2\pi n$/M) to the at least one arbitrary function;

B update means responsive to the computer means and the input means for providing an update B term:

$(-1)^n n\pi$ (−F:new) (1-cos $2\pi n$/M) to the at least one arbitrary function;

convoluting means responsive to the coefficients in the storage means for convoluting the at least two functions $F1(x)$ and $F2(x)$ across the interval of consideration to provide:

$$\int F1(x)\ F2(x)\ dx.$$

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**4,025,770**

## APPARATUS FOR MONITORING ROD-SHAPED COMMODITIES IN CIGARETTE MAKING MACHINES OR THE LIKE

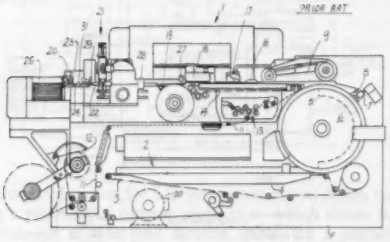
**Joachim Reuland, Hamburg, Germany, assignor to Hauni-Werke Korber & Co., KG, Hamburg, Germany**

**Filed Oct. 20, 1975, Ser. No. 623,660**

**Claims priority, application Germany, Oct. 31, 1974, 2441760**

**Int. Cl.² G01D 5/36**

**U.S. Cl. 250—223 R** **2 Claims**




1. In a machine for making cigarettes or the like wherein successive increments of a rod having a tubular wrapper and fibrous material confined in said wrapper are conveyed lengthwise along and elongated path, the improvement which consists in the provision of a stationary light transmitting guide defining a first portion of said path and having first and second sides located opposite each other and respectively disposed immediately adjacent to and at a greater distance from the increments in said first portion; means for severing said rod in a second portion of said path upstream of said first portion so that said rod yields a file of discrete sections which move lengthwise toward and through said first portion and each of which corresponds to one of said increments whereby successive sections of said file slide along and sweep away any dust or other foreign matter tending to accumulate on said first side of said guide; and photoelectric monitoring means including a first component constituting a light source arranged to direct a light beam against the second side of said guide and a second component constituting a photosensitive transducer, the position of said transducer with respect to said guide and said light source being such that said light beam impinges upon said transducer only after having passed once from said second side to said first side and once from said first side to said second side of said guide.

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**4,025,771**

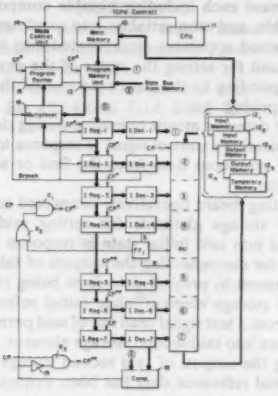
## PIPE LINE HIGH SPEED SIGNAL PROCESSOR

**David D. Lynch, Jr., Northridge, and Lee W. Tower, Los Angeles, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.**

**Filed Mar. 25, 1974, Ser. No. 454,339**

**Int. Cl.² G06F 7/38, 15/00**

**U.S. Cl. 235—156** **12 Claims**



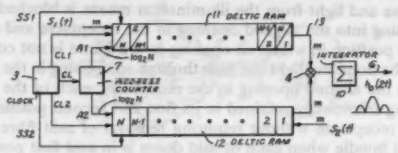
1. A synchronous data processor having a source of synchronizing clock pulses and multiple paths for processing instructions and data comprising

an instruction path including a chain of instruction registers including a first and a last instruction register with all of said instruction registers coupled in cascade, said instruction path including a plurality of stages with each register constituting a stage of the instruction processing path through which all instructions are stepped in response to each of said synchronizing clock pulses, each stage including instruction decoding means coupled to the corresponding instruction register for decoding operation codes in said instructions and providing control signals, and a data processing path having a plurality of stages coupled to response to selected control signals from corresponding stages in said instruction path and including an input stage and an output stage at the beginning and end of said data processing path, and at least one intermediate stage between said input and output stages, said input stage having a plurality of inputs independently receiving data.

## 4,025,772
## DIGITAL CONVOLVER MATCHED FILTER AND CORRELATOR

James Nickolas Constant, 1603 Danbury Drive, Claremont, Calif. 91711

Continuation-in-part of Ser. No. 450,606, March 13, 1974, abandoned. This application July 11, 1975, Ser. No. 595,240
Int. Cl.² G06F 7/52, 15/34
U.S. Cl. 235—156 22 Claims




1. In a system for the digital implementation of convolvers, matched filter, correlators and multipliers, the combination of:

a first digital delay means having a first random access memory for storing first signals in a first time sequence, said first memory having storage locations for N words;

a second digital delay means having a second memory for storing second signals, said second memory having storage locations for N words;

an address counter connected to said memories for addressing N corresponding storage locations of said first and second memories in a sampling interval providing N pairs of outputs in sequence, with each output of a pair of outputs being one of the time sequence of time-reverse sequence of said first time sequence;

clock means connected to said memories and to said address counter for controlling timing operations of said first and second memories and of said address counter, including means for shifting at least said first signals in said first memory after each sampling interval;

multiplier means having as its input the N pairs of outputs of said first and said second memories and providing at its output the serial word-by-word product of said first and said second signals; and

integrator means having said multiplier means output as an input for integrating the product over a number of sampling intervals and providing at its output one of the convolution or correlation of said first and said second signals.

## 4,025,773
## ENHANCED APPARATUS FOR BINARY QUOTIENT, BINARY PRODUCT, BINARY SUM AND BINARY DIFFERENCE GENERATION

Walter Scott Bennett, Loveland, Colo., assignor to Burroughs Corporation, Detroit, Mich.

Continuation of Ser. No. 489,886, July 19, 1974, abandoned. This application Dec. 15, 1975, Ser. No. 639,516
Int. Cl.² G06F 7/52
U.S. Cl. 235—164 5 Claims

1. An arithmetic mechanism for binary numbers, comprising:

a first array comprising a plurality of like structured modules;

means to fill said first array with signals corresponding to a first operand;

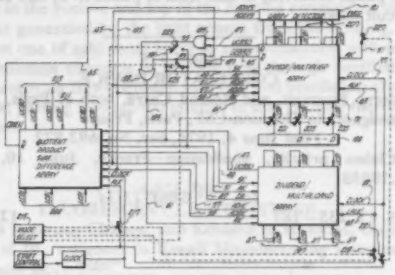
a second array comprising a plurality of like structured modules, like the modules in said first array;

means to fill said second array with signals corresponding to a second operand;

a third array comprising a plurality of like structured modules, said third array providing an arithmetic result;

first control means responsive to said first array for generating signals corresponding to a shift, vertical add and diagonal add sequence of steps for said first and second arrays; and

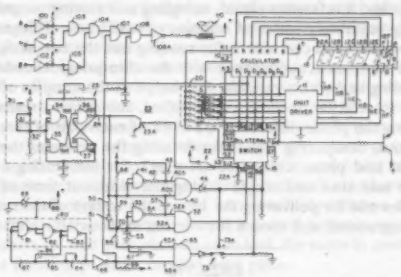
second control means for selecting between first and second modes of operation of said first control means, selection of said first mode causing said first control means to generate signals corresponding to the said sequence required for division of the signals in said second array by the signals in said first array to develop said arithmetic result and selection of said second mode causing said first control means to generate the said sequence required for multiplication of the signals in said second array by the signals in said first array to develop said arithmetic result.



## 4,025,774
## TIMING APPARATUS INCLUDING ELECTRONIC CALCULATOR CIRCUITS

Clifford C. Johnson, Wheeling, and Vincent E. Eltzen, Evanston, both of Ill., assignors to American Hospital Supply Corporation, Evanston, Ill.

Filed June 16, 1975, Ser. No. 587,356
Int. Cl.² G04C 3/00
U.S. Cl. 235—168 15 Claims



1. In electronic timing apparatus including electronic circuit calculator means capable of executing addition and subtraction arithmetic functions; keyboard means for selectively entering digital data to said calculator means; visual display means for displaying the output data of said calculator means; oscillator circuit means for generating a train of pulses of predetermined periods, the improvement comprising: starting circuit means including first switch means and latching circuit means actuated by said first switch means for generating a start signal; sequencing circuit means responsive to said start signal for generating first, second and third signals in time sequence; second switching circuit means responsive to said first signal for effecting an ADD function in said calculator for entering preset time signals into said calculator means through said keyboard means; said calculator means responsive to said second switching circuit means for storing said preset time signals; said second switching circuit means being responsive to said second signal for establishing a modifier value signal in said calculator means; first gate circuit means responsive to said third signal for enabling the passage of output train of

pulses of said oscillator circuit means to said second switching circuit means for performing repetitive arithmetic functions in said calculator means and sequentially incrementing or decrementing the contents of said calculator means by said modifier value, whereby the data accumulated in said calculator means and displayed on said display means is modified in response to the pulses occurring in said train of pulses from said oscillator circuit means.

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**4,025,775**

## CORRELATOR DEVICE

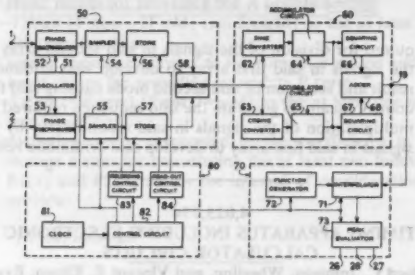
**Thierry Beauvais, and Roland Carré, both of Paris, France, assignors to Thomson-CSF, Paris, France**

**Filed June 4, 1976, Ser. No. 692,872**

**Claims priority, application France, June 10, 1975, 75.18058**

**Int. Cl.² G06F *15/34***

**U.S. Cl. 235—181** **12 Claims**



**2. A correlator device for determining the correlation function of two phase-modulated signals having a given carrier frequency comprising, phase detecting means to which the said modulated signals are applied separately for delivering the phase differences $\phi 1$ and $\phi 2$ between said modulated signals and a reference signal, sampling and storing means for storing separately series of samples of said phase differences $\phi 1$ and $\phi 2$, read-out means for reading out the two series of stored samples in accordance with the chronological order of recording and with a variable shift between the samples of one series in relation to those of the other, subtractor means for forming the phase difference $\phi 1 - \phi 2$ of each pair of samples read-out, computing means for forming the sine and the cosine of said phase difference $\phi 1 - \phi 2$, for integrating separately said sine and cosine during the read out time of the samples and for delivering the sum of the square of the results of integrations, and means for varying said variable shift.**

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**4,025,776**

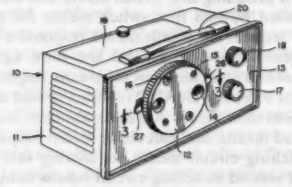
## DOOR CLOSURE FOR FIBER OPTIC LIGHT SOURCE

**Charles David Cawood, Houston, Tex., and Donald J. Mosior, Mundelein, Ill., assignors to American Hospital Supply Corporation, Evanston, Ill.**

**Filed Sept. 18, 1975, Ser. No. 614,499**

**Int. Cl.² G02B *5/14***

**U.S. Cl. 240—1 LP** **7 Claims**



**1. In a fiber optic light source for illuminating a fiber optic bundle, the light source including a frame, illumination means within the frame for providing light, the frame being provided with a pair of openings through which light from the illumination means can pass, and a receptacle for a fiber optic light bundle rotatably mounted on the frame and having a plurality of pairs of openings, each pair of openings being alignable with the openings in the frame, the improvement comprising a pair of doors movably mounted between the frame and the receptacle, each of the doors being movable between a first position in which the door covers one of the openings in the frame and light from the illumination means is blocked from passing into the aligned opening in the receptacle and a second position in which an opening in the frame is not covered by the door and light can pass through an opening in the frame into the aligned opening in the receptacle, each of the doors being frictionally retained in its first and second positions by the receptacle without requiring removal of said fibre optic light bundle when each of said doors is in said first position.**

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**4,025,777**

## CLINICAL ILLUMINATION APPARATUS

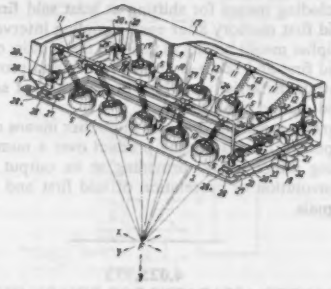
**Yoshito Hayakawa, Kounosu, Japan, assignor to Yamada Iryo Shomei Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 23, 1975, Ser. No. 543,771**

**Claims priority, application Japan, Dec. 2, 1974, 49-137034**

**Int. Cl.² F21V *33/00***

**U.S. Cl. 240—1.4** **11 Claims**



**1. In a clinical illumination system of the type including a ceiling positioned above an area to be illuminated and a lighting device positioned within said ceiling, the improvement comprising:**

**a lamp casing fixedly positioned within said ceiling;**

**a plurality of lamps tiltably mounted within said lamp casing such that the light axes converge at a focus located in a first plane at a desired depth from said lamps;**

**a lamp driver device mounted for movement in a second plane parallel to said first plane and for movement perpendicularly to said first and second planes;**

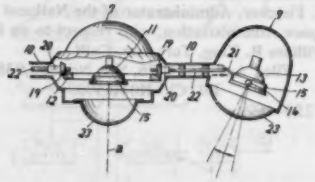
**means, connecting each of said lamps to said lamp driver device, for aligning said lamps such that said axes thereof are aligned to converge at said focus, said aligning means comprising a plurality of springs, one each coupled to one of said lamps and to said lamp driver device; and**

**means, operatively connected to said lamp driver device, for selectively moving said lamp driver device within said second plane and/or perpendicularly to said second plane, and for thereby moving said focus within said first plane and/or perpendicularly to said first plane.**

## 4,025,778
## FOCUSING DEVICE FOR SEALED TYPE MULTI-LAMP FOR OBTAINING SHADOWLESS ILLUMINATION

Yoshito Hayakawa, Kounosu, Japan, assignor to Yamada Iryo Shomei Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 14, 1975, Ser. No. 622,400
Claims priority, application Japan, May 28, 1975, 50-63035
Int. Cl.² A61G *13/00*; F21V *33/00*
U.S. Cl. 240—1.4 8 Claims



1. A multi-lamp shadowless illumination system comprising:

a plurality of sealed lamp housings and a lamp tiltably mounted in each lamp housing each lamp housing having spring means therein engaging the lamp therein for urging the lamp to tilt for moving the axis of the light beam from the lamp in one direction relative to said light axis;

a lamp holding pipe means on which said lamp housings are mounted in a generally horizontal array and in positions with the axes of the lamps directed toward a light axis depending perpendicularly from the central point of the array of lamp housings, said lamps within said housings being tiltable around axes which are perpendicular to said light axis;

operating rods movable linearly within said pipe means and a bearing plate on each lamp against which bears one end of said operating rod for tilting said lamp against the action of said spring means; and

gear means coupled to said operating rods for driving said rods for simultaneously tilting said lamps to move the focal point of the beams of light from said lamps along said light axis.

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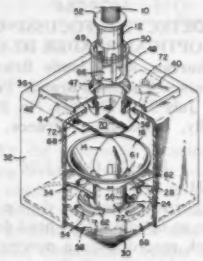
## 4,025,779
## OPTIC FIBER DECORATIVE DEVICE

Joseph M. Ahroni, Pier 39, Room 201, Seattle, Wash. 98134

Filed Apr. 28, 1975, Ser. No. 572,141
Int. Cl.² F21V *29/00*
U.S. Cl. 240—10 L 9 Claims



1. A decorative device comprising,

a housing having a top and a bottom,

a socket at the top of the housing having a side wall and a transparent base,

a light source in the housing directed at the base of the socket,

a spray of optic fibers having lower ends, said lower ends being gathered in a bunch and depending into said socket,

a sleeve over said bunch,

means spacing said sleeve from the base and side wall of said socket to form ventilation channels for air circulation,

transparent shield means at the lower end of said bunch for shielding said optic fibers from heat generated by said light source, and

vents in the bottom and top of the housing arranged to vent heat generated by the light source from the housing, at least one of said vents being in communication with said ventilation channels to provide flow-through ventilation whereby air flows between said vent and ventilation channels, passing through the interior of said housing therebetween.

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## 4,025,780
## FLUORESCENT LIGHT FIXTURE

Kenneth P. Krase, Chicago, and Kenneth R. Hawkins, Gurne, both of Ill., assignors to Kenall Manufacturing Company, Chicago, Ill.

Filed May 20, 1976, Ser. No. 688,164
Int. Cl.² H05B *33/02*
U.S. Cl. 240—51.11 R 7 Claims

1. A fluorescent lighting fixture comprising an elongate, generally rectangular base plate for mounting the fixture which base plate has flange formations along opposite side edges with portions in overlying spaced relation to the inside face of said base plate, an elongate, open ended tray member of a length to fit between the ends of said base plate and having a truncated, triangular cross section with side walls arranged to seat the edges on the base plate and beneath the flange formations thereby to secure said tray member in compartment forming relation on said base plate, means mounting a pair of lamp receiving socket members at opposite ends of said tray member which socket members extend in a direction for mounting a lamp on the outside of said tray member, means mounting a ballast member and associated wiring on the inside of said tray member so as to be enclosed in said compartment, said base plate having end wall members with portions adapted to be moved into overlying relation to the ends of said tray member when it is seated between said end members on said base plate so as to lock the same in compartment forming position on said base plate.

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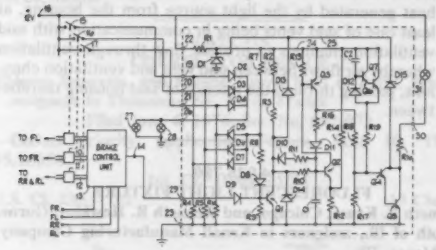
## 4,025,781
## BRAKE PRESSURE FAILURE CIRCUIT FOR MULTI-LINE BRAKE SYSTEMS

Malcolm Brearley, Solihull, England, assignor to Girling Limited, England

Filed Sept. 2, 1975, Ser. No. 609,667
Claims priority, application United Kingdom, Sept. 5, 1974, 38802/74
Int. Cl.² B60Q *1/00*
U.S. Cl. 340—52 C 10 Claims

1. A brake pressure failure warning circuit for use in a multi-line brake system comprising a plurality of pressure switches sensitive to the fluid pressures in the respective pressure lines and each actuable when the fluid pressure in the associated line attains a predetermined level, a detecting circuit connected to said switches and arranged to produce an output signal when any one of said switches is actuated, a muting circuit also connected to said switches and arranged to

prevent the detecting circuit from producing its output signal when all of the switches are actuated and warning means operable by said output signal, the detecting circuit including a transistor having a collector, base and emitter with its collector connected to a supply via said switches in series respectively with a plurality of diodes and a common resistor, the



muting circuit being connected to the base of the transistor so as to render the transistor conductive when muting is required, the muting circuit including a plurality of diodes and a comparable number of resistors coupled with the cathodes of the respective diodes, the anode of the respective diodes being connected with a first resistor and a second resistor which is in turn coupled with a third resistor.

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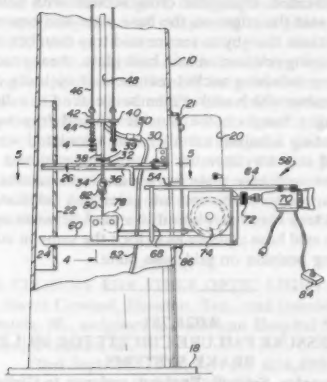
**4,025,782**

## POLE AND DEVICE FOR RAISING AND LOWERING LIGHTING FIXTURES THEREON

**Robert E. Kaeser, Cincinnati, Ohio, assignor to LCA Corporation, Bala Cynwyd, Pa.**

**Filed Feb. 24, 1976, Ser. No. 660,759**
**Int. Cl.² F21V *21/36***
**U.S. Cl. 240—64** **7 Claims**



1. Apparatus comprising a pole, a frame at the top of the pole, at least one light fixture on said frame, at least one hoisting cable extending from said frame over a pulley at the top of the pole and downwardly through the pole, an anchor connected to the lower end of said cable, releasable locking means in said pole for preventing said anchor and hoisting cable from moving upwardly, a movable door on said pole adjacent the elevation of said anchor, bracket means inside said pole opposite said door for receiving one end of a portable device for lowering said frame, limit stop means adjacent said door for contacting an upper surface of such a device and for counteracting reaction forces on such a device during lowering of said frame, said anchor having means to which a cable and winch on the portable device may be selectively connected to raise and lower said frame after release of said locking means.

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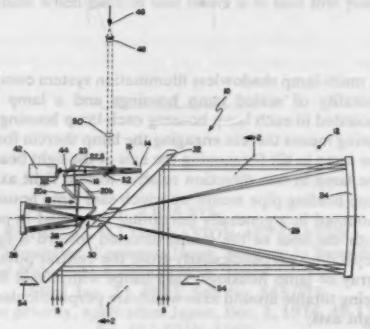
**4,025,783**

## GREGORIAN ALL-REFLECTIVE OPTICAL SYSTEM

**James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of, and William B. King, Torrance, Calif.**

**Filed Apr. 28, 1976, Ser. No. 680,938**
**Int. Cl.² H04B *9/00***
**U.S. Cl. 250—199** **14 Claims**



1. In an optical laser system, an optical collector comprising a paraboloidal primary reflector; an ellipsoidal secondary reflector, said secondary reflector and said primary reflector facing each other and located on an optical axis, a focus of said secondary reflector coinciding with a focus of said primary reflector; folding reflector means located on said optical axis for forming a folded optical axis containing a system focus of said collector; and laser beam detector means located on said folded axis in proximity to said system focus for detecting an incoming signal beam.

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**4,025,784**

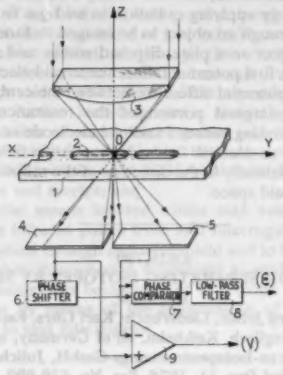
## DEVICE FOR DETECTING FOCUSSING ERROR IN AN OPTICAL READER HEAD

**Jean-Claude Lehureau, and Claude Bricot, both of Paris, France, assignors to Thomson-Brandt, Paris, France**

**Filed July 22, 1975, Ser. No. 598,164**
**Claims priority, application France, July 26, 1974, 74.26062**
**Int. Cl.² G01J *1/20***
**U.S. Cl. 250—201** **7 Claims**

1. A focussing error detection device for detecting the focussing error in an optical reader head designed to read-out a diffractive track recorded on a moving data carrier, said reader head comprising a radiation source and an optical device for projecting a read-out spot onto said track, said detection device comprising means for detecting the emergent radiation emerging from said track which comprises at least two photodetector cells having respective outputs for delivering output signals, said cells being located in a plane perpendicular to the optical axis of said emergent radiation aligned along the projection of said track onto said plane and disposed symmetrically in relation to said optical axis and further means for measuring the time-shift between said output sig-

nals of said cells having two inputs coupled to said outputs of the cells by a coupling device, said further means having an output delivering a control signal characteristic of said focussing error.

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**4,025,785**

## METHOD OF AND APPARATUS FOR THE AUTOMATIC FOCUSING OF STEREOSCOPIC MICROSCOPES

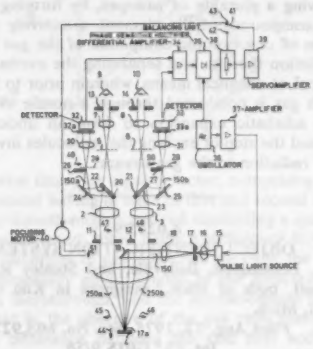
**Ortwin Mueller, Koenigsbronn, Germany, assignor to Carl Zeiss-Stiftung, Oberkochen, Germany**

**Filed May 6, 1975, Ser. No. 575,026**

**Claims priority, application Germany, May 13, 1974, 2423136**

**Int. Cl.² G01J *1/36***

**U.S. Cl. 250—204** **10 Claims**




1. A method for the automatic focusing of stereoscopic microscopes having divided observation beams for binocular observation of an object plane which comprises generating a focusing beam, directing said focusing beam to impinge upon said object plane to form a luminous area thereon which is superimposed on the observation beams impinged on said object plane and is reflected by said object along the respective divided paths of said observation beams, deflecting those portions of said focusing beams which are reflected by said object along each of the divided paths of said observation beams to direct said focusing beams, respectively, to impinge upon separate photoelectric detectors which convert axial shifts of the object plane of said luminous area with respect to said microscope during transverse movement of said luminous area in front of said photoelectric detectors into directionally dependent electric signals, and using said signals to control a focusing motor to move said microscope to compensate for such axial shifts.

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**4,025,786**

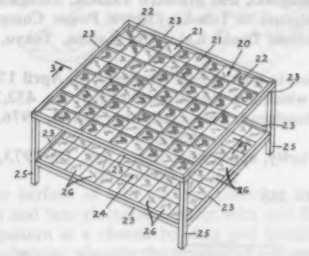
## SOLAR ENERGY POWER GENERATING ARRAY

**George Henry Hamilton, 1425 Fourth St., SW., Washington, D.C. 20024**

**Filed Jan. 2, 1975, Ser. No. 538,156**

**Int. Cl.² H01J *39/12***

**U.S. Cl. 250—211 R** **17 Claims**



1. A multi-layer of panel of power converting elements for converting electromagnetic energy incident on said panel to another form of energy, said electromagnetic energy supplied by a source having a first width and emitting electromagnetic energy from a plurality of points which are spaced from each other along said first width, said panel comprising:

a. first energy converting means having a second width and being disposed a first distance from said source, the projection of said first energy converting means on an imaginary sphere being defined by the source being spaced from said first energy converting means by said first distance from the source; and

b. second energy converting means disposed adjacent said first energy converting means and spaced from said first energy converting means by a second distance which is at least 1/5 the quantity defined by the product of said first distance multiplied by said second width and divided by said first width.

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**4,025,787**

## SEPARATION OF MIXTURES OF GASEOUS ISOTOPES

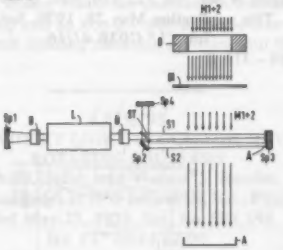
**Karl Janner, Erlangen, and Klaus Gregorius, Neunkirchen near Erlangen, both of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany**

**Filed June 19, 1975, Ser. No. 588,183**

**Claims priority, application Germany, June 24, 1974, 2430315**

**Int. Cl.² H01J *39/34***

**U.S. Cl. 250—251** **11 Claims**



1. A method for separating a gaseous mixture of molecules having different resonances comprising:

a. forming a polarized standing electromagnetic wave beam having nodes and a frequency causing deflection of the molecules in different directions relative to each other;

b. flowing the mixture through said beam; and

c. dividing said beam by reflection into two substantially parallel wave trains which are displaced in phase by about one-quarter of their wave length so as to prevent the molecules from dwelling at the beam's nodes, whereby said molecules will be separated by deflection in different directions relative to each other.

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## 4,025,788
## RADIOMETRIC ANALYZER

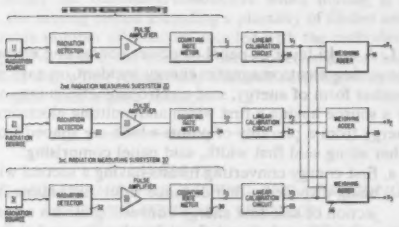
**Sumitaro Arima, Sendai; Minoru Oda; Kyoichi Miyashita, both of Amagaski, and Mamoru Takada, Amagasaki, all of Japan, assignors to Tohoku Electric Power Company, Inc. and Mitsubishi Denki Kabushiki Kaisha, Tokyo, both of, Japan**

**Continuation-in-part of Ser. No. 569,143, April 17, 1975, abandoned, which is a continuation of Ser. No. 432,235, Jan. 10, 1974, abandoned. This application Feb. 5, 1976, Ser. No. 655,490**

**Claims priority, application Japan, Jan. 18, 1973, 48-8100**

**Int. Cl. G01v** *5/00*

**U.S. Cl. 250—253** **4 Claims**



1. A radiometric analyzer for measuring the characteristic values of a material by radiation comprising:

a plurality of radiation measuring subsystems having different ratios of sensitivities to each of the elements of the material;

the pluraliity of radiation measuring subsystems being equal in number to the elements of the material;

linearizing circuits connected to each of the subsystems for calibrating nonlinear calibration functions of the subsystems to measure linear combinations of the contents of the elements of the material per unit volume from outputs of the subsystems; and

weighing adders for operating the linear combinations of the outputs of the linear calibration circuits.

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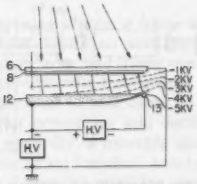
## 4,025,789
## IMAGE FORMATION METHOD

**Yujiro Ando, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 522,456, Nov. 8, 1974, Pat. No. 3,961,192. This application May 28, 1976, Ser. No. 690,924**

**Int. Cl.² G03B** *41/16*

**U.S. Cl. 250—315 R** **5 Claims**




1. An image forming process which comprises;

filling a space formed between two electrodes with a gas, wherein one of the two electrodes comprises a resistance member having one face which is planar and an opposite face which is curved to provide a gradually changed thickness from a central portion to a marginal portion of said one electrode;

simultaneously applying radiation to said gas from a point source through an object to be imaged to form an image of the object on a plate disposed within said space, and applying a first potential difference to said electrodes and a second potential difference between the central portion and the marginal portion of the resistance member, thereby forming between said one electrode and the other electrode an electric field whose electric field lines extend substantially in the direction of the radiation passing through said space.

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## 4,025,790
## METHOD FOR SEPARATING ISOTOPES BY MEANS OF LASERS

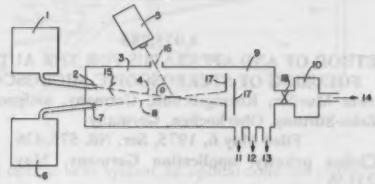
**Heinz Leonhard Jetter, Liederbach; Karl Gurs, Eschborn, and Wolfgang Englisch, Kelkheim, all of Germany, assignors to URANIT Uran-Isotopentrennungs-GmbH, Julich, Germany**

**Filed Dec. 11, 1975, Ser. No. 639,890**

**Claims priority, application Germany, Dec. 11, 1974, 2458563**

**Int. Cl.² H01J** *39/34*

**U.S. Cl. 250—284** **23 Claims**




1. Method for separating the different isotopes of an element having a plurality of isotopes, by forming a gas from isotopic compounds of the element, selectively exciting the molecules of one isotopic compound of the gas by applying laser radiation thereto, and separating the excited molecules by physical or chemical means, wherein prior to laser excitation such gas is conducted through a nozzle to cause it to undergo adiabatic expansion to form an undercooled gas stream, and the step of exciting the molecules involves applying laser radiation to the gas stream.

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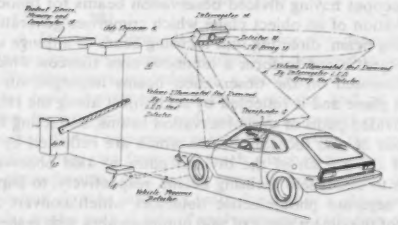
## 4,025,791
## OBJECT IDENTIFICATION SYSTEM

**John W. Lennington, Belleville, and Stanley R. Sternberg, Ypsilanti, both of Mich., assignors to Kilo Corporation, Detroit, Mich.**

**Filed Aug. 12, 1975, Ser. No. 603,927**

**Int. Cl.² G01S** *9/56*

**U.S. Cl. 250—341** **57 Claims**



10. A vehicle identification system comprising:

interrogator means including a portion adapted to transmit infrared pulses through the windshield of vehicles and to receive infrared pulses transmitted through the windshield of said vehicle, said portion being positioned in front of said windshield of said vehicles to receive infrared pulses transmitted through the windshield by said transponder means and to transmit infrared pulses through said windshield to said transponder means, said portion further including means restricting the field of transmission of said infrared pulses and the field of receipt of said infrared pulses so that only one vehicle may be located with its windshield within said fields of transmission and receipt; and

transponder means located within said vehicle so as to receive infrared pulses from said interrogated which are transmitted through said windshield and to transmit infrared pulses through said windshield to said interrogator, said transponder being adapted to provide an identifying number by means of the transmission of said infrared pulses to said interrogator.

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**4,025,792**

## FILTERS FOR GAS DETECTORS

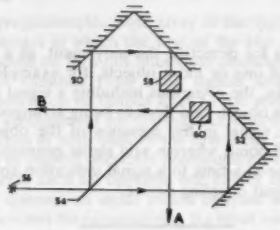
**John Edward Harries, Teddington, England, assignor to The Secretary of State for Industry in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England**

**Filed Sept. 2, 1975, Ser. No. 609,628**

**Claims priority, application United Kingdom, Sept. 3, 1974, 38485/74**

**Int. Cl.² G01N *21/26***

**U.S. Cl. 250—343** **12 Claims**




1. A radiation filter, for a gas detector, comprising an optical interferometer having in each of first and second different optical paths therethrough a gas cell containing a quantity of the gas to be detected; there being a difference in pressure between the quantities of gas in the two gas cells; the gas cells being of substantially equal lengths in the direction of the optical paths therethrough; and the interferometer being arranged so that in the absence of the gas cells there is zero optical path difference between the said first and second optical paths through the interferometer.

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**4,025,793**

## RADIATION DETECTOR WITH IMPROVED ELECTRICAL INTERCONNECTIONS

**John B. Shaw, Santa Barbara; Peter R. Blatt, and Francis I. Gesswein, both of Goleta, all of Calif., assignors to Santa Barbara Research Center, Goleta, Calif.**

**Filed Oct. 20, 1975, Ser. No. 623,682**

**Int. Cl.² G01J *1/00***

**U.S. Cl. 250—370** **5 Claims**

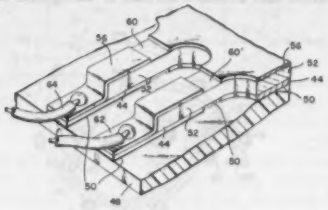
1. A process for fabricating an infrared detector array comprising the steps of:

a. depositing a first conductive pattern having at least one opening therein on one of two substantially parallel major planar surfaces of an infrared radiation sensitive substrate,

b. bonding said first conductive pattern to a suitable support means,

c. forming a mask on a second of said two planar surfaces of said infrared sensitive substrate and aligned with said opening in said first conductive pattern; and

d. depositing a second conductive pattern on said second




planar surface of said infrared radiation sensitive substrate and into electrical contact with said first conductive pattern at a chosen bonding pad location adjacent said substrate, whereby the removal of said mask provides aligned openings in both said first and second conductive patterns which define the active region of said infrared sensitive substrate.

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**4,025,794**

## IONIZATION DETECTORS WITH IRON-55 AS A RADIOACTIVE SOURCE

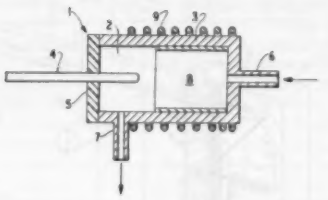
**James Ephraim Lovelock, Bowerchalke, Salisbury, Wiltshire, England**

**Filed Oct. 20, 1975, Ser. No. 624,196**

**Claims priority, application United Kingdom, Oct. 22, 1974, 45758/74**

**Int. Cl.² G01T *1/18***

**U.S. Cl. 250—381** **3 Claims**




1. An ionization detector comprising an ionization chamber, inlet and outlet means for directing gas through the chamber, electrode means within the chamber in ionization detection relationship and an iron-55 radioactive source within the chamber to emit ionizing radiation particles into the gaseous matter.

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**4,025,795**

## ULTRAVIOLET LIGHT PROCESSOR HAVING ROTATING SHUTTERS

**James K. Lackore, Joliet, and Warren J. Ramler, Elmhurst, both of Ill., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed May 27, 1975, Ser. No. 581,195**

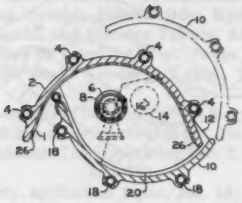
**Int. Cl.² H01J *37/00***

**U.S. Cl. 250—504** **22 Claims**

1. In an ultraviolet light processor having an optical system comprising at least one concave cylindrical reflector having a mouth through which ultraviolet light is reflected from a generally linear source of ultraviolet light to a workpiece, the improvement comprising a cylindrical shutter having a concave surface, said cylindrical shutter having an axis of rotation

which is generally parallel to the elements of said concave cylindrical reflector and which axis of rotation is contained within space bounded by said reflector and its mouth, wherein said cylindrical shutter is

a. rotatable to a first position between said source and said workpiece to block radiation emanating from said source from impinging upon said workpiece, wherein in said first position said concave surface is facing said source, and



b. rotatable to a second position which is away from between said source and said workpiece to permit impingement of radiation emanating from said source upon said workpiece, wherein in said second position said concave surface is facing said source with said reflector therebetween.

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**4,025,796**

## PHOTOELECTRIC INSTRUMENT FOR MEASURING THE LENGTH OF AN OBJECT

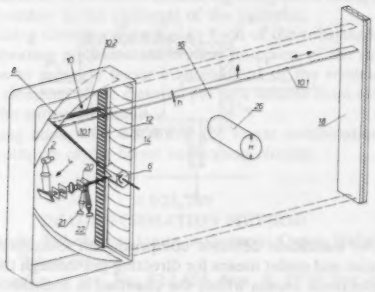
**Jurgen Erdmann, Waldkirch, Germany, assignor to Erwin Sick Optik-Elektronik, Waldkirch, Germany**

**Filed July 9, 1975, Ser. No. 594,554**

**Claims priority, application Germany, July 19, 1974, 2434829**

**Int. Cl.² G01N *21/30***

**U.S. Cl. 250—560** **13 Claims**



1. In a photoelectronic instrument for measuring a dimension of an object, the improvement comprising:

means including scanning means for producing a slim scanning light beam and directing said beam progressively in a given direction for scanning across an object field adapted to contain a said object with both of the opposite sides of said field in said given direction being fully unobscured by said object,

circuit means including photoelectric transducer means for receiving said scanning beam to the extent it is not fully obscured by said object during said scanning and developing a continuous electrical signal $U_1$ proportional uniformly to the magnitude of the light flux on said object field and having an instant magnitude of $U_e$ when said beam is fully unobscured as aforesaid,

means for continuously developing from said $U_1$ signal a half signal $U_d/2$ representing the instant value of said $U_1$ signal when half the light beam is obscured by said object either at the beginning and ending of an object scan by said beam regardless of the absolute magnitude of said fully unobscured beam, and

coincidence means connected to receive said $U_1$ and $U_d/2$ signals for comparing same and generating an output signal which changes abruptly when said $U_1$ and $U_d/2$ signals are equal.

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**4,025,797**

## APPARATUS FOR DETECTING THE MOVEMENT OF ONE OR MORE OBJECTS

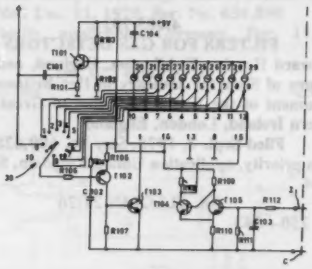
**Sten-Ake Olaus Rydborn, Kloxhultsvagen 21, Almhult, Sweden**

**Filed Oct. 17, 1975, Ser. No. 623,275**

**Claims priority, application Sweden, Oct. 18, 1974, 7413176**

**Int. Cl.² G08B *21/00***

**U.S. Cl. 307—116** **21 Claims**



1. Apparatus for detecting the movement, at a pre-determined point, of one or more objects, for example, threads, strips or the like, the apparatus including a signal generating device for each object, said devices being arranged to generate an electric signal in the presence of the object at said pre-determined point, wherein said signal generating devices are coupled one-at-a-time to a signal indication apparatus by means of an input coupling device.

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**4,025,798**

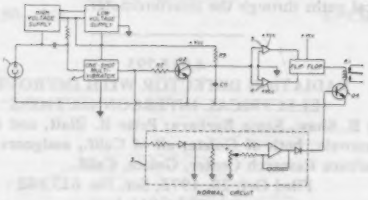
## FAIL-SAFE CIRCUIT

**Leon Sidney Siegel, Tulsa, Okla., assignor to Combustion Engineering, Inc., Windsor, Conn.**

**Filed Oct. 3, 1975, Ser. No. 619,554**

**Int. Cl.² G01F *23/00***

**U.S. Cl. 307—118** **4 Claims**



1. A method of monitoring a system for component failure in an an electric system in which a source of power is applied to a relay to hold the relay in one of two position, including, establishing a path of radiation transverse to a path in which material accumulates,

effectively disconnecting the source of power from the relay

when the material in its path does not block the radiation in its path, and

generating a low-order radiation signal through a monitored portion of the electric system and applying the low-order signal to keep the source of power connected to the relay, whereby component failure in the monitored portion of the electric system will interrupt the low-order signal and effectively disconnect the source of power from the relay which will release the relay to the other of its two positions.

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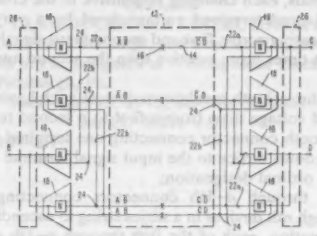
**4,025,799**

## DECODER STRUCTURE FOR A FOLDED LOGIC ARRAY

**Dennis T. Cox, Kingston; Se J. Hong, and Daniel L. Ostapko, both of Poughkeepsie, all of N.Y., assignors to IBM Corporation, Armonk, N.Y.**

**Filed Nov. 6, 1975, Ser. No. 629,260**
**Int. Cl.² H03K** *19/20;* **G11C** *5/06*
**U.S. Cl. 307—207** **5 Claims**



1. In a programmable logic array of the type comprising at least two arrays in which the first of the two arrays receives input variables on its input lines from decoders that generate these input variables from input signals and feeds the responses thereto on its output lines to the second of the two arrays, an arrangement for driving four selectively segmentable input lines at both ends of the first array comprising:

two sets of one-bit decoders positioned on each side of the first array each set opposite one end of the lines,

variable connection input means coupled to the inputs of the decoders for personalizing the input connection to the decoders to select the input signals supplied to the decoders;

variable connection output means coupled between the outputs of the decoders and the input lines of personalizing the connections between the outputs of each set of decoders and the four input lines to select what decoder output is connected to which one or more of the four input lines whereby one or two-bit decoding of input signals supplied to the decoders can be supplied on the input lines of the first array.

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**4,025,800**

## BINARY FREQUENCY DIVIDER

**Frank Marion Wanlass, Cupertino, Calif., assignor to Integrated Technology Corporation, Sunnyvale, Calif.**

**Filed June 16, 1975, Ser. No. 587,241**
**Int. Cl.² H03K** *23/8, 27/00*
**U.S. Cl. 307—225 C** **7 Claims**

1. A binary divider circuit for generating an output signal having a frequency of one-half that of its input signal, comprising:

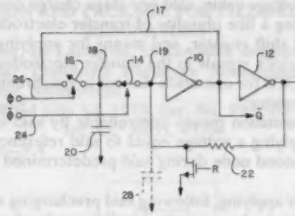
first and second inverters connected in series;

first and second switch means connected in series, from the input to the output of said first inverter;

means for opening or closing said switches in response to said input signal such that said switches operate 180° out of phase;

a capacitor connected to the common node between said switches, said capacitor being large with respect to any stray capacitance on the input to said first inverter; and

resistor feedback means connected from the output of said second inverter to the input of said first inverter, for



referencing said second inverter output to said first inverter input, said resistor being of such value that the time constant associated with said resistor and said capacitor is large with respect to the signal propagation delay through said inverters.

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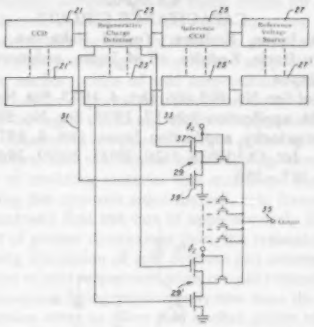
**4,025,801**

## REGENERATIVE MOS TRANSISTOR CHARGE DETECTORS FOR CHARGE COUPLED DEVICE SHIFT REGISTERS IN A MULTIPLEXING SYSTEM

**William Milton Gosney, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Division of Ser. No. 499,717, Aug. 22, 1974, Pat. No. 3,979,603. This application May 19, 1976, Ser. No. 687,731**
**Int. Cl.² H03K** *5/18, 5/20, 3/286, 3/353*
**U.S. Cl. 307—362** **7 Claims**



1. A data storage system comprising a plurality of charge coupled device shift register stores, each shift register including a plurality of stages, each having a plurality of transfer electrodes, means for applying multi-phase clock signals to said electrodes to shift data signals along said shift register, data output means for said shift register adjacent a selected electrode of one of said stages, said selected transfer electrode connected for application of a predetermined phase clock signal thereto; regenerative charge detector means comprising in combination:

bi-stable circuit means comprising a pair of cross-coupled inverter stages connected between a first voltage supply line, and a second voltage supply line comprising a fixed supply voltage line, said bi-stable circuit having first and second nodes;

said output means of said shift register connected to said first node;

means for precharging the first and second nodes to a reference voltage set by a value $V_{out} = V_{in}$ on an output voltage

($V_{out}$) versus input voltage ($V_{in}$) transfer characteristic of said inverter stages;

transmission means including a one stage charge coupled device connected between said second node and a voltage source for generating a voltage equal to said reference voltage value, said one stage charge coupled device including a like plurality of transfer electrodes as a stage of said shift register, and means for applying said multiphase clock signals to the transfer electrodes of said one stage CCD for operation thereof in synchronism with said shift register;

said transmission means controllable by said clock signals for applying a voltage equal to said reference voltage to said second node during said predetermined clock signal phase;

means for applying, following said precharging step, the said predetermined phase clock signal to each of said selected transfer electrode, said first supply line and said transmission means, for transferring a data signal to the output means of said shift register to cause regenerative imbalance between the voltages at said first and second nodes in a sense corresponding to the level of said transferred data signal compared with that of said reference voltage; and

logic output means coupled to said first and second nodes for generating a logic output signal according to the sense of said imbalance;

and means for coupling the logic output means of each data store in sequence to a common system output to multiplex said logic output signals from said plurality of detector means.

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**4,025,802**

## CAPACITANCE CIRCUIT

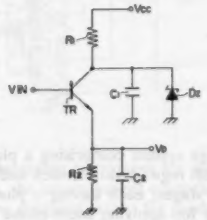
**Fumihito Inoue, Kodaira; Yoshiji Nakajima, Fuchu, and Noboru Horie, Kodaira, all of Japan, assignors to Hitachi, Ltd., Japan**

**Division of Ser. No. 403,406, Oct. 4, 1973, Pat. No. 3,962,718. This application July 17, 1975, Ser. No. 596,764**

**Claims priority, application Japan, Oct. 4, 1972, 47-99061**

**Int. Cl.² H03K** *5/20;* **H01L** *29/90, 29/92*

**U.S. Cl. 307—350** **8 Claims**




1. A capacitance circuit comprising a pn-junction capacitance element having a breakdown characteristic and which generates noise signal components at breakdown, and a pn-junction Zener diode whose breakdown voltage is lower than that of said pn-junction capacitance element and whose noise characteristic is preferable to that of said pn-junction capacitance element, said pn-junction capacitance element and said pn-junction Zener diode being connected in parallel with each other, and wherein said pn-junction Zener diode forms a by-pass for the noise signal components which are generated from said pn-junction capacitance element by breakdown thereof, wherein said capacitance circuit is fabricated as a semiconductor integrated circuit.

**4,025,803**

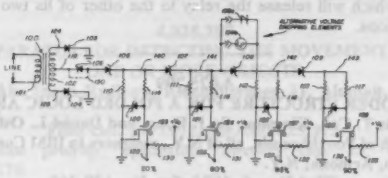
## MULTI-LEVEL CLIPPING CIRCUIT

**Gayle Russell Norberg, Columbia Heights, Minn., assignor to Control Data Corporation, Minneapolis, Minn.**

**Filed Mar. 1, 1976, Ser. No. 662,314**

**Int. Cl.² H03K** *5/08*

**U.S. Cl. 307—237** **16 Claims**



1. A circuit for providing first through *n*th, *n* at least 2, output signals, each changing responsive to the crossing of an associated predetermined voltage level by a varying input signal appearing across first and second input signal terminals, the first at times more positive than the second and comprising:

a. first through *n*th breakdown devices each having a preselected voltage drop from a first to a second terminal;

b. a zeroeth connector connecting one terminal of the first breakdown device to the input signal terminal having the same ordinal designation;

c. first through *n*−1th connectors connecting the first through *n*th devices in a series string in ascending ordinal designation, each of the first through *n*−1th connectors respectively connecting terminals of opposite ordinal designation on devices having the same and one greater ordinal designations, and the first connector connected to the first device's terminal which is not connected to the signal terminal; and

d. first through *n*th return path resistors, all having a first terminal connected to the input signal terminal which is not connected to the first breakdown device, the first through *n*−1th having their second terminal connected respectively to the first through *n*−1th connectors, and the *n*th having its second terminal connected to that terminal of the *n*th breakdown device which is not connected to the *n*−1th connector;

wherein the preselected breakdown device voltage drops are selected such that the sum of the voltage drops between the zeroeth and *i*th connectors substantially equals the predetermined voltage level associated with the *i*th output signal, and wherein the first through *n*th output signals appear respectively across the first through *n*th return path resistors.

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**4,025,804**

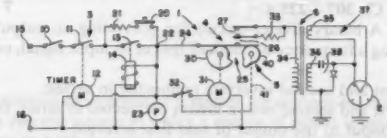
## MICROWAVE OVEN CONTROL WITH MECHANICAL SWITCH LOCK-OUT

**Jimmy R. Rickard, Mansfield, Ohio, assignor to The Tappan Company, Mansfield, Ohio**

**Filed Nov. 13, 1975, Ser. No. 631,684**

**Int. Cl.² H01H** *43/00*

**U.S. Cl. 307—141** **15 Claims**




1. A circuit for selectively supplying continuous and intermittent input energy to an electric apparatus that produces an output in response to the input energy thereto, comprising:

means for connecting the circuit to an electric energy source,

coupling means for coupling energy in the circuit to the electric apparatus,

switch means operable in a first condition for providing energy in the circuit to said coupling means and in a second condition for interrupting the flow of energy to said coupling means,

electrically powered switch operating means for cyclically operating said switch means to such respective conditions to provide intermittently energy in the circuit to said coupling means, and

selectively operable means for selectively locking said switch means in such first condition independently of said switch operating means to provide uninterrupted energy in the circuit to said coupling means as long as said switch means is selectively locked in such first condition by said selectively operable means.

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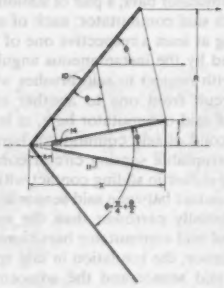
4,025,805

## CONICAL TRANSDUCER AND REFLECTOR APPARATUS

John W. Coltman, Pittsburgh, and Charles H. Jones, Murrysville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 15, 1975, Ser. No. 568,232
Int. Cl.[2] H01L 41/04
U.S. Cl. 310—8.7 7 Claims



1. An apparatus for transmitting and reflecting acoustical energy comprising a frusto-conical reflector and a transducer, said transducer comprising:

a frusto-conical radiating member positioned coaxially with respect to said reflector and having at least one active surface, the half angle $\phi$ of said reflector being related to the half angle $\theta$ of said radiating member in accordance with the formula

$$\phi = \frac{\pi}{4} \pm \frac{\theta}{2}$$

for energy directed to or from a point of interest distant from said reflector and for energy to or from a point of interest on the axis in accordance with the formula

$$\phi = \left(\frac{\pi}{4} \pm \frac{\theta}{2}\right) - \left(\tfrac{1}{2} \tan^{-1} \frac{R}{S}\right),$$

wherein

R= the radius of the reflector at a point where a ray from the point of interest is reflected normally to the surface of the radiating member, and

S= the distance from the point of interest on the axis to a point on the axis where an imaginary line intersects the axis normally and a point on the reflector R distance from the axis.

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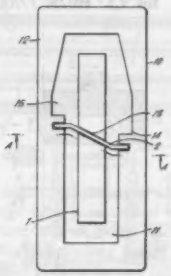
4,025,806

## SUSPENSION AND PACKAGE FOR PIEZO-ELECTRIC RESONATORS

Claude Weber, Le Landeron, Switzerland, assignor to Societe Suisse pour l'Industrie Horlogere Management Services S.A., Bienne, Switzerland

Filed July 14, 1975, Ser. No. 595,502
Int. Cl.[2] H01L 41/04
U.S. Cl. 310—9.4 7 Claims



1. Support system for a piezo-electric resonator assembly comprising at least two approximately parallel suspension wires for supporting said piezo-electric resonator and for conducting electrical energy to said piezo-electric resonator, each of said suspension wires being attached to an opposite side of said resonator and each having at least two opposite anchor points for attaching to said support system, said support system further comprising a flat frame means for allowing said piezo-electric resonator to be easily mounted thereon without requiring the bending of said two suspension wires and for thereafter providing a convenient support to which said opposite anchor points of said suspension wires can be quickly fastened for support and electrical connection, said frame means having a thickness which is approximately the same as the distance between said anchor points of opposite suspension wires, and said frame means being formed of a middle layer of insulating material with metallized conductive layers covering the opposite sides thereof, said frame means having an enclosed first cut out of approximately the same shape as, but of greater dimensions than, the resonator alone, but a mounting dimension of said first cut out corresponding to the positions of said suspension wires on said resonator, said mounting dimension being substantially less than the lengths of the suspension wires to allow said anchor points to extend over frame means when said resonating assembly is in a mounting position, and at least two further cut out notches continuous with said first cut out and each being adjacent to the position of said mounting dimension of said first cut out, said further cut out notches, in combination with said first cut out, providing a dimension greater than that of the resonator assembly with its attached suspension wires to allow said resonator assembly to be inserted by a single translating movement into said cut outs until a suspension wire is positioned in the planes of the opposite sides of said frame, and to allow the resonator with its attached suspension wires to thereafter be moved with the suspension wire anchor points remaining approximately in the planes of the surfaces of the frame, to a proper mounting position with suspension-wire anchor points extending over said frame at the position of said mounting dimension, said support system further including anchor means for fastening said suspension-wire anchor points to said metallized conductive layers,

whereby said resonator with its attached suspension wires may be moved into a position and fastened to said metal-

lized conductive layers without deforming the suspension wires.

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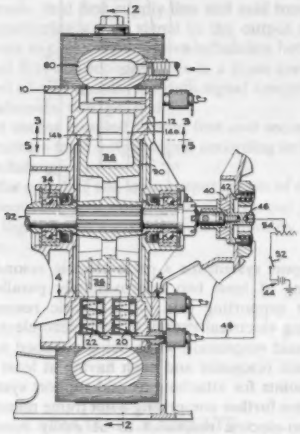
4,025,807

## ELECTROMAGNETIC MOTOR

Leonard W. Clover, deceased, late of San Jose, Calif., and by Grace Clover, administratrix, 19759 Douglas Ave., Saratoga, Calif. 95070

Filed Jan. 26, 1976, Ser. No. 652,498
Int. Cl.² H02K 37/00
U.S. Cl. 310—46 5 Claims



1. An electromagnetic motor which comprises

a rotor having a plurality of permanent magnets at regularly spaced positions on its periphery,

a stator closely encompassing said rotor and mounting a plurality of permanent magnets in predetermined positions to provide cyclical attraction and repulsion forces on said rotor magnets,

said stator also mounting a plurality of electromagnets in predetermined positions to provide attraction and repulsion forces on said rotor magnets, and

means for periodically energizing said electromagnets to generate forces on said rotor to propel the same in a forward direction when the forces of said stator permanent magnets on said rotor magnets urge said rotor in a backward direction,

said rotor permanent magnets having identical horseshoe magnets similarly mounted on said rotor whereby the North poles of said magnets are circularly aligned around said rotor periphery and the South poles of said magnets are also circularly aligned,

said stator permanent magnets being composed of adjacent pairs of horseshoe magnets whose poles are of opposite polarity and are circularly aligned with the poles of said rotor permanent magnets,

said electromagnets having like poles when energized and consisting of first and second laterally-spaced sets, each aligned circularly with said rotor and stator permanent magnet poles, and

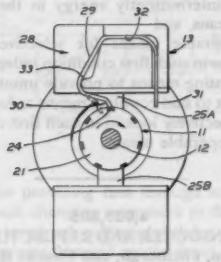
said electromagnets of the first set which attract the rotor magnets when energized being spaced forwardly a small amount substantially less than the dimension of one pole in the direction of rotor rotation relative to said electromagnets of the second set which repulse said rotor permanent magnets when energized.

4,025,808

## COMMUTATING MACHINE WITH INTEGRAL SPEED CONTROL

Walter M. Grengg, Madison, and Karl E. Weitzmann, Middleton, both of Wis., assignors to Barber-Colman Company, Rockford, Ill.

Filed July 21, 1975, Ser. No. 597,537
Int. Cl.² H02K 11/00
U.S. Cl. 310—68 B 11 Claims



1. In combination in an electro-dynamic commutating machine, a rotor rotatable about an axis; a commutator concentric and rotatable with said rotor; a plurality of commutator bars on the commutator; a plurality of windings on said rotor between respective pairs of the commutator bars; insulation separating the commutator bars; a pair of stationary brushes in sliding contact with said commutator; each of said brushes at all times contacting at least a respective one of the commutator bars determined by the instantaneous angular position of the commutator with respect to said brushes whereby a continuous power circuit from one to another of the brushes comprises a first of said commutator bars, at least one of the windings and a second of said commutator bars; and characterized by an interruptable sensing circuit comprising a stationary conducting sensor in sliding contact with said commutator; the area of contact between said sensor and the commutator being substantially narrower than the spaces between adjacent portions of said commutator bars coming into sliding contact with the sensor; the insulation in said spaces breaking contact between said sensor and the adjacent commutator bars

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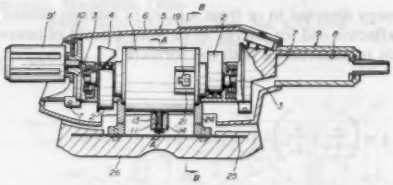
4,025,809

## MASSAGING VIBRATOR

Akihiko Teranishi, Nagoya, Japan, assignor to Kabushiki Kaisha Teranishi Denki Seisakusho, Japan

Filed Mar. 8, 1976, Ser. No. 664,956
Claims priority, application Japan, Mar. 18, 1975, 50-31783
Int. Cl.² H02K 7/06
U.S. Cl. 310—81 6 Claims



1. In a massaging vibrator device wherein massaging is done by a vibrating pad (26) attached to a pad plate (25) when said pad (26) is applied to a human body, said massaging vibrator having a longitudinal case and frame (5, 7) with grip means (8, 9) extending longitudinally out of said case and frame,

with a motor (1) having output ends disposed in said case body and frame and longitudinal crank shaft means (3) coupling the motor output ends to the frame, the improvement therein including:

a. first and second eccentric balance weight means (2) disposed on said crank shaft means (3) at said motor output ends said eccentric balance weight means (3) being disposed in opposed phase, and,

b. pad coupling means (24) between said motor (1) and said pad plate (25) directly coupling the motor to the pad, whereby said eccentric balance weight means cause the motor and coupled pad to vibrate.

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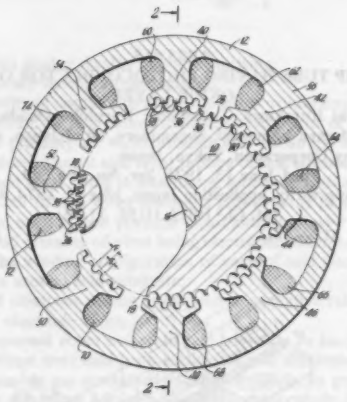
**4,025,810**

## LOW NOISE SYNCHONOUS MOTORS

**John H. Field, Norfolk, Mass., assignor to Sigma Instruments, Inc., Braintree, Mass.**

**Filed Aug. 29, 1975, Ser. No. 609,073**
**Int. Cl.² H02K** *19/00*
**U.S. Cl. 310—162** **19 Claims**



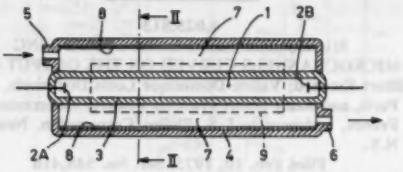
1. A synchronous motor, comprising a rotor assembly including a cylindrical portion having an axis, said portion having a plurality of peripherally-spaced radially-projecting rotor teeth, and a stator assembly coaxial with said rotor assembly and having a plurality of radially projecting stator poles, said poles each having a plurality of stator teeth projecting radially to a circle coaxial with said rotor, means for electrically energizing said stator poles, permanent magnet means in one of said assemblies for establishing a magnetic field at said rotor teeth, said rotor teeth and said stator teeth each extending longitudinally along the stator poles and the rotor portion, the plurality of rotor teeth and the stator teeth being skewed relative to each other, each tooth defining a maximum peripheral width when projected upon a plane transverse to the axis and each pair teeth between them defining a minimum peripheral space when projected on the plane transverse to the axis; the maximum peripheral width of each stator tooth, skewed relative to the rotor teeth, being smaller than or equal to the minimum peripheral space between the rotor teeth and the maximum peripheral width of each rotor tooth, skewed relative to the stator teeth, being smaller than or equal to the minimum peripheral space on the stator.

**4,025,811**

## LIQUID-COOLED HIGH PRESSURE METAL VAPOR DISCHARGE LAMP IN PARTICULAR TO BE USED IN A METHOD OF MANUFACTURING A COLOR TELEVISION DISPLAY TUBE

**Johannes Cornelis Adrianus Van Nes, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Oct. 29, 1975, Ser. No. 626,617**
**Claims priority, application Netherlands, Nov. 27, 1974, 7415440**
**Int. Cl.² F21V** *29/00;* **G03B** *41/00;* **H01J** *7/26, 5/16*
**U.S. Cl. 313—22** **6 Claims**




1. A liquid-cooled high pressure metal vapor discharge lamp comprising a discharge tube surrounded by a cooling jacket having an inlet aperture and an outlet aperture, a cylindrical mirror disposed inside said cooling jacket around the axis of the discharge tube, said cooling jacket being a tubular envelope preferably manufactured from quartz around the discharge tube, said cylindrical mirror consisting of a thin metal layer on a part of inside of said tubular envelope.

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**4,025,812**

## ALUMINA CERAMIC ALKALI METAL LAMP HAVING METAL GETTER STRUCTURE

**Charles I. McVey, Shaker Heights, Ohio, assignor to General Electric Company, Schenectady, N.Y.**

**Continuation-in-part of Ser. No. 622,099, Oct. 14, 1975, abandoned. This application Aug. 2, 1976, Ser. No. 710,896**
**Int. Cl.² H01J** *61/24*
**U.S. Cl. 313—176** **11 Claims**

1. A high pressure alkali metal vapor discharge lamp comprising:

an outer vitreous envelope having a base attached thereto and a pair of inleads sealed into said envelope and connected to said base, said outer envelope being evacuated;

an inner envelope of alumina ceramic having sealing closures at opposite ends supporting electrodes therein and affording connections thereto;

said inner envelope containing an ionizable medium including alkali metal;

a mounting frame supporting said inner envelope within said outer envelope, and including conductors connecting said inleads to said sealing closures;

and at least one of said closures comprising a portion of group VB metal, a connector extending from said group VB portion to a getter member of group IV B metal and operating at a lower temperature than said portion, said connector being of metal from group VB and IV B, whereby said getter member serves as a lower temperature getter and reservoir for contaminants.

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**4,025,813**

## MICROCHANNEL PLATE COMPRISING MICROCHANNELS CURVED ON THE OUTPUT SIDE

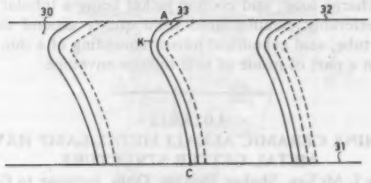
**Gilbert Eschard; Valere Dominique Louis Duchénois, both of Paris, and Remy Henri Francois Polaert, Villecresnes, all of France, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Feb. 10, 1975, Ser. No. 548,416**

**Claims priority, application France, Feb. 13, 1974, 74.04823**

**Int. Cl.² H01J *43/22, 43/24***

**U.S. Cl. 313—105 CM** **1 Claim**




1. A secondary-emissive microchannel plate comprising a plurality of substantially identical parallel aligned microchannels having inner walls which are both secondary-emissive and electrically resistive for electron multiplication, each microchannel having an axis which at most curves only slightly except in the vicinity of a point positioned from the output of said microchannel by a distance equal to a few times the diameter of said microchannel, said axis curving sharply in the vicinity of said point to cause substantially all electrons travelling along said microchannel to make a final collision with the wall of said microchannel in the vicinity of said point, the inner wall surfaces of said microchannels being conductive adjacent to the output thereof, whereby is reduced the energy dispersion of exiting secondary electrons.

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**4,025,814**

## TELEVISION CAMERA TUBE HAVING CHANNELED PHOTOSENSITIVE TARGET SPACED FROM SIGNAL ELECTRODE

**Paulus Philippus Maria Schampers; Marino Giuseppo Carasso, and Arthur Marie Eugene Hoeberechts, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

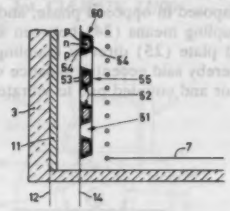
**Filed Sept. 10, 1975, Ser. No. 612,250**

**Claims priority, application Netherlands, Sept. 27, 1974, 7412756**

**Int. Cl.² H01J *29/45, 31/44, 31/40***

**U.S. Cl. 313—367** **3 Claims**

1. A television camera tube comprising an electron beam source and a target which is to be scanned by the electron beam and which comprises a transparent electrically conductive signal electrode and a discrete structure of photo sensitive elements provided on an electron beam pervious electrically conductive carrier spaced from the signal electrode, each of said photosensitive elements having a portion exposed to the electron beam which has a conductivity substantially less than that of said carrier, said structure of discrete photosensitive elements being a matrix of channels provided in a disk of semiconductor material, of which channels the side walls have a conductivity type opposite to that of the disk material, the remaining disk material being covered with a resistance layer, said structure, in cooperation with the




signal electrode, defining a potential field which is adjustable and which, proceeding in the direction of movement of the scanning electron beam, shows at least two successive saddle points in which the scanning electron beam experiences a local beam splitting which is a function of potentials to be applied and of local exposure of the target.

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**4,025,815**

## PICK-UP TUBE HAVING PHOTOCONDUCTOR ON ZINC OXIDE LAYER

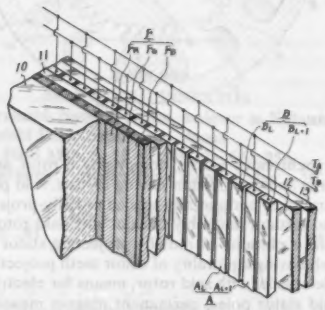
**Hiromichi Kurokawa, Yokahama; Haruhiko Okada, Tokyo, and Masaru Yamazaki, Sagamihara, all of Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed June 13, 1975, Ser. No. 586,599**

**Claims priority, application Japan, June 14, 1974, 49-67954**

**Int. Cl.² H01J *31/38, 31/46***

**U.S. Cl. 313—371** **8 Claims**

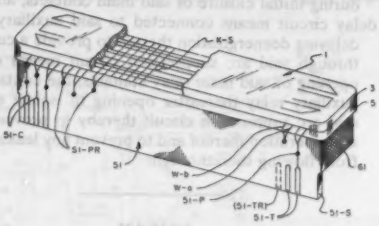


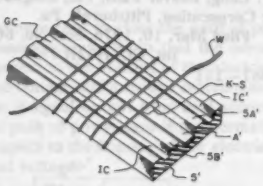

1. A target structure for an image pickup tube comprising a transparent substrate, transparent conductive layers on a surface of said substrate defining first and second comb-shaped electrodes having interfitting electrode elements and being connected to respective output terminals for deriving image information, a transparent zinc oxide layer formed on said conductive layers and having a resistivity between that of a conductor and an insulator, and a photo-conductive layer formed on said zinc oxide layer, said photo-conductive layer being of a P-type material which is either antimony trisulfide or which includes amorphous-selenium as a major proportion thereof.

## 4,025,816
## BARGRAPH DISPLAY

Geoffrey Phillip Watts, Mesa, Ariz., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Sept. 9, 1975, Ser. No. 611,743
Int. Cl.² H01J 61/067, 61/66
U.S. Cl. 315—169 R 17 Claims




5. A gas analog display panel comprising:

a substrate having a front surface;

a plurality of continuous electrode wires wound around said substrate in alternating sequence, each turn of each of said plurality of wires around said substrate having a portion adjacent said front surface of said substrate, each of said turns being in alternating sequence with a turn of another of said wires to form a ladder array of said portions, each of said portions of an individual wire of each of said plurality of wires being electrically interconnected by the winding configuration of each of said plurality of wires around said substrate;

second electrode means positioned in operative relation to said electrode wires;

a transparent cover sealed to said substrate to form a thin envelope over said front surface of said substrate; and

an ionizable gas contained in said envelope, to provide a glow discharge between said second electrode and any one of said wires for transfer along said ladder array by external electrical potential means connected to said second electrode and said wires to apply electrical potential in repeating sequence to said plurality of wires.

## 4,025,817
## TRIGGER DEVICE FOR AN ELECTRONIC FLASH UNIT

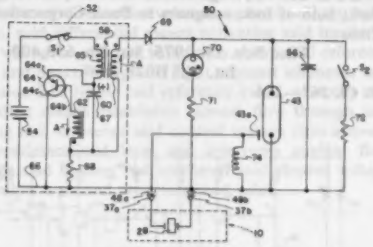
Frank Dayton Wollschleger, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 502,686, Sept. 3, 1974, abandoned.
This application Jan. 12, 1976, Ser. No. 648,067
Int. Cl.² G03B 15/03; H05B 41/32
U.S. Cl. 315—241 P 4 Claims

1. In an electronic flash unit including first and second electrical conductors, a flashtube containing an ionizable gas having (1) a normal, first state in which said gas constitutes an electrically non-conductive medium, and (2) an ionized , second state in which said gas constitutes an electrically conductive medium, said flashtube further including two opposed primary electrodes and an external trigger electrode responsive to an electrical trigger-control signal for ionizing said flashtube gas, said trigger electrode being connected to said first electrical conductor and one of said primary electrodes being connecteed to said second conductor, an improved trigger mechanism for said electronic flash unit comprising:

a. a piezoelectric generator having first and second electrical output contacts coupled to said first and second conductors, respectively; and

b. an inductor interconnecting said first and second output

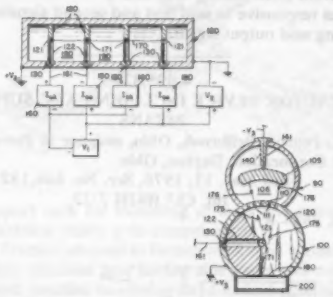



contacts, said inductor having an inductance of a magnitude for producing upon actuation of said piezoelectric generator a trigger-control signal having a series of oscillations that occur over an extended period of time, said trigger-control signal being effective to change said flashtube gas from said first state to said second gate to produce an electrically conductive path between said primary electrodes.

## 4,025,818
## WIRE ION PLASMA ELECTRON GUN

Robert P. Giguere, Los Angeles; Robert D. Washburn, Malibu, and George Wakalopulos, Los Angeles, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Apr. 20, 1976, Ser. No. 678,524
Int. Cl.² H01J 27/00, 33/02
U.S. Cl. 315—337 17 Claims




1. An electron-ion plasma source, comprising in combination:

a first elongated chamber having an elongated electrically conductive member extending the length of the first chamber without being in contact with the walls of said first chamber;

a second elongated chamber in cooperation with the first chamber and parallel thereto having a plurality of baffles within the second chamber spaced from each other, each of the baffles having a central aperture and a radial bore extending to the central aperture;

a wire running the length of the second chamber extending through each of the central apertures and insulated from the walls of the second chamber and the baffles; and

electrical conductors joined with the wire at the central openings, one of the conductors passing respectively

through a corresponding one of the bores and through the wall of the second chamber, said electrical conductors being electrically insulated from the baffles, and from the second chamber.

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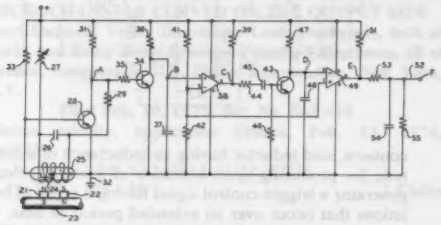
4,025,819

## MOTION DETECTING SIGNAL SOURCE

Edward E. Lafever, Hagerstown, and Larry O. Gray, Greensfork, both of Ind., assignors to Dana Corporation, Toledo, Ohio

Filed Nov. 19, 1975, Ser. No. 633,400
Int. Cl.² H02P 5/00
U.S. Cl. 361—236 9 Claims



1. An apparatus for generating an output signal representing the road speed of a vehicle, comprising:

magnetic means attached to a member of the vehicle rotating at a speed proprotional to the road speed of the vehicle for generating a first magnetic field;

oscillator means responsive to the absence of said first magnetic field for generating a first signal and responsive to the presence of said first magnetic field for generating a pulsed second signal, said oscillator means including a biasing coil, switch means for selectively applying current to said biasing coil to generate a second magnetic field and means responsive to said first and second magnetic fields for turning off said switch means to remove said current from biasing coil; and

means responsive to said first and second signals for generating said output signal.

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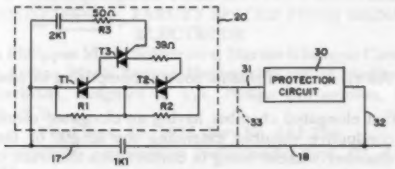
4,025,820

## CONTACTOR DEVICE INCLUDING ARC SUPRESSION MEANS

John K. Penrod, Bellbrook, Ohio, assignor to Power Management Corporation, Dayton, Ohio

Filed Mar. 11, 1976, Ser. No. 666,152
Int. Cl.² H02H 7/22
U.S. Cl. 361—8 8 Claims




2. An electrical contactor for connecting and disconnecting an alternating current power source and a load including

a main relay having main contacts connected between the source of current and the load, first auxiliary contacts which close momentarily prior to and open shortly after the opening and closing of said main contacts, and second auxiliary contacts which open and close substantially simultaneously with said main contacts,

solid state arc suppression circuit means responsive to the operation of said first auxiliary contacts and connected in parallel with said main contacts for providing a low impedance current path around said main contacts to suppress arcing,

an auxiliary relay having contacts electrically connected in series with said arc suppression circuit means and operable in response to said second auxiliary contacts whereby said arc suppression circuit means is electrically isolated during initial closure of said main contacts, and

delay circuit means connected to said auxiliary relay for delaying deenergization thereof to provide a current path through said arc suppression circuit means during the opening of said main relay contacts, the contacts of said auxiliary relay thereafter opening to isolate electrically said arc suppression circuit thereby to prevent inadvertent operation thereof and to prevent any leakage current from flowing therethrough.

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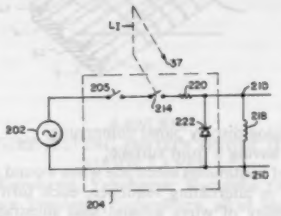
4,025,821

## CIRCUIT BREAKER WITH IMPROVED TRIP MEANS HAVING A HIGH RATING SHUNT TRIP

Walter W. Lang, Beaver Falls, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 10, 1976, Ser. No. 665,598
Int. Cl.² H02H 1/04
U.S. Cl. 361—111 14 Claims




1. A circuit breaker, comprising:

separable contacts;

a trip mechanism operable upon actuation to separate said contacts;

a trip coil operable upon energization to actuate said trip mechanism;

a sensing circuit coupled to said contacts and operable upon overcurrent conditions through said contacts to energize said trip coil; and

a shunt trip device connected to said trip coil and comprising a zener diode, said device being operable upon actuation to energize said trip coil and cause separation of said contacts.

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4,025,822

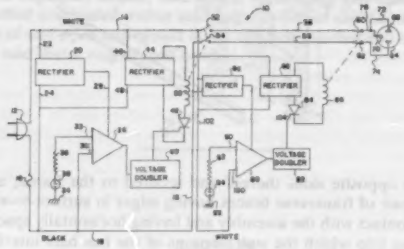
## TWO TO THREE-WIRE CONVERTER CIRCUIT

W. Taliaferro Hughes, 1519 Country Club Road, Wilmington, N.C. 20401, and Stewart P. Barrett, Jr., P.O. Box 3612, 3417 Walton Way Extension, Augusta, Ga. 30903

Filed Aug. 5, 1975, Ser. No. 602,173
Int. Cl.² H02H 3/14
U.S. Cl. 361—45 10 Claims

1. Protective circuit apparatus for use in adapting a disconnectable electrical device to a two-wire electrical supply having a high and a neutral line wherein a housing of an electrical device may be connected to said neutral line, said protective circuit comprising: means for sensing the voltage on the high and neutral lines with respect to the potential of the housing of the electrical device, said sensing means including a first means for sensing the voltage between the normally high line and the housing of the electrical device and a second means for sensing the voltage between the normally neutral line and the housing of the electrical device, said first and second

sensing means providing a first and a second output signal, respectively, and means responsive to said sensing means for providing a closed circuit condition for power flow only if the neutral line of the electrical device is connected to the neutral line of the electrical supply, said means for providing a closed circuit condition receiving said first and second output signals, said means for providing a closed circuit condition including a first switch means operative in response to a signal output




from said first sensing means to close the path of power flow when said first sensing means detects that the normally high line is high with respect to the housing of the electrical device by a predetermined voltage and a second switch means operative in response to a signal output from said second sensing means to open the path of power flow if the normally neutral line is high with respect to the housing of the electrical device by a predetermined voltage.

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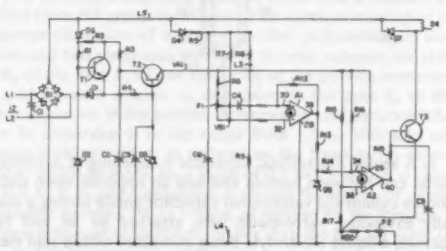
**4,025,823**

## CIRCUIT BREAKER INCLUDING UNDERVOLTAGE RELEASE MECHANISM AND CONTROL CIRCUIT

**Walter W. Lang, Beaver Falls, and John T. Wilson, Beaver, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed July 11, 1975, Ser. No. 595,183**
**Int. Cl.² H02H *3/24***
**U.S. Cl. 361—111** **28 Claims**



1. A circuit breaker, comprising:
a housing;
separable contacts supported within said housing;
a trip mechanism supported within said housing and operable upon actuation to effect separation of said contacts;
an undervoltage release mechanism supported within said housing and comprising a holding coil, said undervoltage release mechanism operable upon interruption of current flow through said holding coil to actuate said trip mechanism; and
a device supported within said housing for controlling said holding coil comprising:
means for supplying electrical power to said holding coil;
regulating means connected to said holding coil for controlling current flow through said holding coil, said regulating means including an input element, activation of said input element establishing regulated current flow through said holding coil;
a source of control voltage;
means coupled to said control voltage source for establishing a regulated electrical reference value;
means coupled to said control voltage source for establishing an electrical test value proportional to said control voltage; and
differential means connected to said input element, and coupled to said reference value means and said test value means, said differential means activating said input element whenever said test value rises above said reference value and deactivating said input element whenever said test value falls below said reference value, whereby said regulating means establishes current flow through said holding coil whenever said control voltage rises above a first predetermined level and interrupts current flow through said holding coil whenever said control voltage falls below a second predetermined value.

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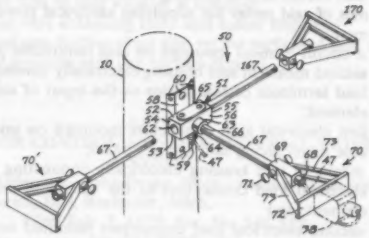
**4,025,824**

## TRANSFORMER SUPPORT RACK

**Harry P. Cheatham, 201 Pickens Lane, Columbia, Tenn. 38401**

**Filed Feb. 12, 1976, Ser. No. 657,617**
**Int. Cl.² H02B *9/00***
**U.S. Cl. 361—332** **8 Claims**




1. A support rack for mounting at least one transformer upon an electrical utility pole comprising:
a. a pole bracket adapted to be mounted upon a utility pole,
b. a hollow junction box having side walls and a bottom wall, said junction box being fixed to said pole bracket,
c. a horizontal conductor opening through one of said side walls,
d. an elongated hollow arm having open proximate and remote ends,
e. said proximate end being received within said horizontal opening,
f. a transformer support bracket,
g. means fixing said transformer support bracket upon the remote end portion of said arm so that said remote end remains open,
h. a meter wire opening in the bottom wall of said junction box,
i. said arm and said junction box receiving at least one electrical conductor wire from a transformer mounted on said transformer support bracket and extending through said arm, said junction box and down through said meter wire opening to a meter mounted on said utility pole.

## 4,025,825
## METER POWER DISTRIBUTION APPARATUS FOR MOBILE HOMES WITH A DETACHABLE FRONT PANEL FOR POWER OUTLET FITTINGS

Delworth Shrader, 5088 Nerissa Way, San Jose, Calif. 95124

Filed July 24, 1975, Ser. No. 598,551
Int. Cl.² H02B 9/00
U.S. Cl. 361—374 9 Claims

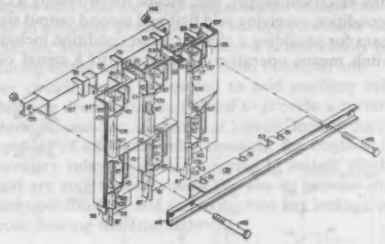
1. A meter power distribution system comprising:
a. a housing with an upright panel and with a removable front panel facing said upright panel;
b. a meter supported by said removable front panel, said meter having line terminals and load terminals;
c. first means in said housing connected to said line terminals of said meter for supplying electrical power to said meter;
d. a circuit element mounted on said removable panel;
e. second means in said housing electrically connecting said load terminals of said meter to the input of said circuit element;
f. first electrical load connectors mounted on said removable panel facing said upright panel;
g. means in said housing electrically connecting said first electrical load connectors to the output of said circuit element; and
h. second electrical load connectors mounted on said upright panel and mating with said first electrical load connectors for establishing electrical connections with electrical loads.

## 4,025,826
## CONTROL CENTER BUS BAR BRACE

John R. Wilson, Darien; Brij M. Bharteey, Bolingbrook, and Sadiq A. Shariff, Palos Park, all of Ill., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 11, 1975, Ser. No. 612,605
Int. Cl.² H02B 1/08
U.S. Cl. 361—334 5 Claims

1. A control center for distributing electric power from a power supply source to power consuming devices, comprising a cabinet having a frame providing a compartment on the front side of the cabinet, at least one circuit interrupter in the compartment and movable transversely into and out of position adjacent to bus bars, mounted in the cabinet a plurality of vertical, horizontally spaced bus bars in said cabinet, each bus bar comprising a planar body portion and a flange-like stab portion, the stab portion extending from the planar body toward the circuit interrupter, barriers encasing the bus bars and consisting essentially of electrically insulative material and having good heat transfer properties, support means supporting the assembly of the bus bars and barriers in position and comprising a plurality of pairs of transverse braces at vertically spaced intervals and clampingly engaging the barri-

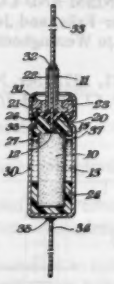


ers on opposite sides thereof and secured to the frame, and each pair of transverse braces having edges in surface-to-surface contact with the assembly and having horizontally spaced notches into which the stab portions of the bus bars interfit.

## 4,025,827
## ELECTROLYTIC CAPACITOR HAVING A HIGHLY STRAINED ELASTOMERIC SEALING ELEMENT

William F. Pellerin, Bennington, Vt., and Stephen C. Lovely, Williamstown, Mass., assignors to Sprague Electric Company, North Adams, Mass.

Filed Apr. 7, 1976, Ser. No. 674,516
Int. Cl.² H01G 9/00
U.S. Cl. 361—433 7 Claims




1. A sealed electrolytic capacitor comprising: a cylindrical metal can having a bottom end and an opposite open end; a porous cylindrical valve-metal capacitor anode having a coaxially extending valve-metal wire attached to an end face thereof; a liquid electrolyte being contained within said metal can and said anode being contained coaxially within and spaced from the side walls of said metal can; an insulating spacer being positioned in said bottom end of said can; a plastic fluorocarbon sealing member being positioned against said capacitor section and sealed within said open end of said can, said anode wire extending centrally through said plastic member, said plastic member having a generally cylindrical shape and a centrally located depression at the outer end face thereof; a header comprising a mass of glass surrounding and fused to a tubular metal eyelet and surrounded by and fused to an outer metal ring; and an elastomeric bung being positioned between said header and said plastic member and having said anode wire extending centrally therethrough, said elastomeric bung in the unstressed condition having an average diameter as measured in the radial direction with reference to said anode wire which average diameter is no greater than 0.7 times the diameter of said cylindrical plastic member, said

elastomeric bung, said plastic member, said capacitor anode and said spacer all being axially compressed between said header and said bottom end of said can, said elastomeric bung being squeezed out radially to occupy more than 75% of the interface area between said header and said plastic member, the ratio of the diameter of the maximum thickness of said compressed bung being greater than 3:1, a peripheral portion of said compressed plastic member projecting into a portion of the space between the side walls of said cylindrical can and said capacitor anode, said anode wire being electrically attached and sealed within said metal eyelet of said header, the lip of said open end of said metal can being sealed and bonded to said metal ring of said header.

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## 4,025,828
## RECTIFIER AND RECTIFYING METHOD

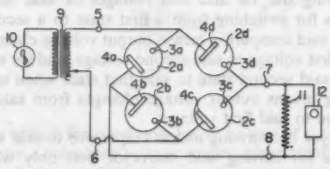
**Takashi Sunamori, and Sachio Obana, both of Ohtake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan**

**Filed July 21, 1975, Ser. No. 597,903**

**Claims priority, application Japan, July 24, 1974, 49-84115; Sept. 11, 1974, 49-103794; Nov. 22, 1974, 49-134747**

**Int. Cl.² H01G 9/16**

**U.S. Cl. 361—436** **12 Claims**




1. A rectifier comprising a vessel filled with a solution selected from the group consisting of an aqueous solution or an aqueous dispersion of a salt of purified polycarboxylic acid resin, and two electrodes immersed therein, wherein the ratio $S_1/S_2$ of the area $S_1$ of one electrode at the portion immersed in said aqueous soluton or dispersion to the area $S_2$ of the other electrode at the portion immersed in said aqueous solution or dispersion is in the range from 1.5 to 300, said salt having a $pK_a(r)$ value, as defined by the formula (I) shown below, of 8.0 or more, an $n$ value of 0.5 to 15 and an $\alpha$ value of 0.8 to 2.0, and containing 5 weight % or less of acidic impurities having a $PK_a(e)$ value, as defined by the formula II shown below, of at least 0.5 smaller than the $PK_a(r)$ value of the said polycarboxylic acid resin:

$$pH = pK_a(r) + n \log (\alpha/1 - \alpha) \quad (I)$$

wherein pH is the pH value of an aqueous solution or dispersion of the salt of the polycarboxylic acid resin; $pK_a(r)$ is the constant -log $K_a(r)$; $K_a(r)$ is the dissociation constant in water of the polycarboxylic acid resin; $n$ is a numeral constant and $\alpha$ is the degree of neutralization of the polycarboxylic acid resin with a base,

$$pH = pK_a(e) + \log (\alpha_1/1 - \alpha_1) \quad (II)$$

wherein pH is the PH value of an aqueous solution of the acidic impurities; $pK_a(e)$ is the contant -log $K_a(e)$; $K_a(e)$ is the dissociation constant in water of the acidic impurities; and $\alpha_1$ is the degree of neutralization of the acidic impurities with a base.

## 4,025,829
## SILVER MICA BLOCK CONDENSER AND METHOD OF MAKING THE SAME

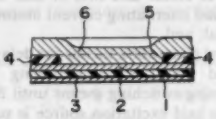
**Masuichi Makihara, Tokyo, Japan, assignor to Shinnitoku Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 10, 1975, Ser. No. 639,322**

**Claims priority, application Japan, Apr. 8, 1975, 50-42451**

**Int. Cl.² H01G 4/04, 1/14**

**U.S. Cl. 361—305** **4 Claims**




1. A silver mica block condenser comprising:
a. a mica plate having surfaces on opposite sides thereof and edges about its perimeter;
b. at least one silver film on one of said surfaces, the edges of said film about its perimeter being spaced inwardly from the edges of said mica plate leaving a peripheral portion of said one surface between the edges of said silver film and the edges of said mica plate;
c. a glass film on said silver film and bonded to said peripheral portion of said one surface of said mica plate to retain said silver film on said one surface of said mica plate, said glass film including a window over said silver film, the peripheral edges of said window being spaced inwardly from the edges of said silver film leaving only a portion of said silver film not covered by said glass film;
d. a solder film extending over said window and the surface of said glass film about the periphery of said window, the portion of said solder film extending over said window being depressed through said window and contacting the surface of said silver film whereby the surface of said solder film at said window is concave;
e. a lead wire extending from said solder film; and
f. at least one further silver film on the surface of said mica plate opposite said one surface thereof.

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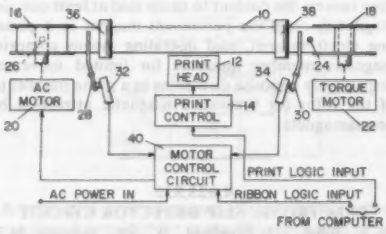
## 4,025,830
## MOTOR CONTROL AND WEB MATERIAL DRIVE SYSTEM

**Dany P. Delaporte, Lake Orion, Mich., assignor to Computer Peripherals, Inc., Rochester, Mich.**

**Filed Feb. 3, 1975, Ser. No. 546,559**

**Int. Cl.² H02P 1/42**

**U.S. Cl. 318—6** **17 Claims**




1. A bidirectional web material transport and control apparatus comprising:
a. an alternating current motor having at least first and second excitation windings;
b. an electric excitation source;
c. first web material storage reel mechanically coupled for rotation to said alternating current motor;
d. second web material storage reel;

e. means mechanically coupled to said second web material storage reel for providing tension in said web material when said web material is transferred between said first and second storage reels;
f. web position switching means actuable in response to the transferral of a predetermined length of web material either from said first reel to said second reel or from said second reel to said first reel;
g. motor reversing switching means for coupling said excitation source to either said first or said second excitation winding of said alternating current motor in response to a control signal; and
h. control signal generation means for delaying current flow through said web position switching means and said motor reversing switching means until the instantaneous current from said excitation source is substantially zero.

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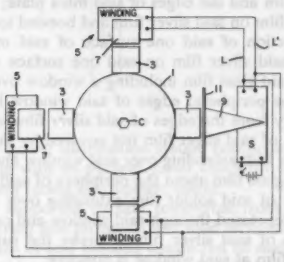
**4,025,831**
**BRUSHLESS DIRECT CURRENT MOTOR**
**Robert L. Webb, Balboa, P.O. Box 2180, Canal Zone**
**Filed Feb. 18, 1975, Ser. No. 550,581**
**Int. Cl.² H02K *29/00***
**U.S. Cl. 318—254** **17 Claims**




1. A brushless D.C. motor comprising a rotor provided with a plurality of angularly spaced permanent magnets secured thereto and movable along a circular path,
at least one fixed electromagnet having a pair of opposite poles spaced from each other in the same angular direction as the poles of the permanent magnets and confronting said path,
reversing switch means connected between a D.C. source and said at least one fixed electromagnet,
and operating means controlled by rotation of the rotor to in turn operate said switch means to energize the at least one electromagnet to attract a permanent magnet, to deenergize the at least said one electromagnet, and to then reverse the current to cause said at least one electromagnet to repel the permanent magnet as it passes the one electromagnet, said operating means comprising a magnetic member mounted for limited movement in respectively opposite directions in a plane parallel to that of the rotor for successive magnetic attraction by the permamagnets.

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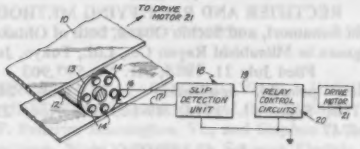
**4,025,832**
**ELECTRONIC SLIP DETECTOR CIRCUIT**
**Emory E. Jones, III, Bluefield, W. Va., assignor to Pyott-Boone, Inc., Tazewell, Va.**
**Filed Nov. 6, 1975, Ser. No. 629,520**
**Int. Cl.² H02P *5/16***
**U.S. Cl. 318—317** **12 Claims**

1. In a conveyor belt driving apparatus, a slip responsive motor disconnecting system comprising:
a. means for detecting belt speed and for providing signals corresponding thereto;
b. amplifying means connected to said detecting means for amplifying said signals and for providing amplified signals;
c. waveform shaping means connected to said amplifying means for receiving said amplified signals and for providing a fixed shape to said amplified signals;
d. pulse generating means responsive to said waveform shaping means for producing a pulse responsive to an output of said waveform shaping means;
e. a frequency to voltage conversion means, connected to said pulse generating means and responsive to the pusles produced thereby, for producing an output voltage level dependent on a frequency of repetition of sad pulses;
f. adjustable reference voltage means for providing an adjustable reference voltage;
g. comparing means connected to said conversion means and said adjustable reference voltage means for comparing said output voltage level with said adjustable reference voltage, and for producing a first voltage when said reference voltage is greater than said output voltage level, and for producing a second voltage when said reference voltage is not greater than said output voltage level;




h. switching means connected to said comparing means for receiving the 1st and 2nd voltages of said comparing means for switching from a first state to a second state when said comparing means output voltage changes form said first voltage to said second voltage, and for switching form said second state to said first state when said comparing means output voltage changes from said second vlotage to said first voltage;
i. conveyor belt driving means responsive to said switching means for driving said conveyor belt only when said switching means is in said first state;
whereby said conveyor belt driving means ceases to drive said conveyor belt when a relationship exists between said reference voltage and said output voltage of said frequecny to voltage conversion means indicative of said conveyor belt moving at a speed lower than some predetermined value, so that said conveyor belt driving means is de-energized when said conveyor belt slip exceeds a predetermined threshold.

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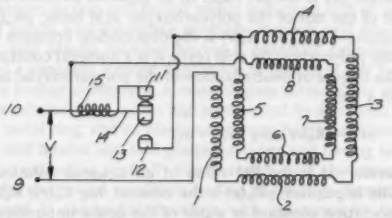
**4,025,833**
**TORQUE DEMAND THERMAL SWITCH**
**Charles A. Lawton, Springfield, Ohio, assignor to Robbins & Myers, Inc., Springfield, Ohio**
**Continuation of Ser. No. 392,975, Aug. 30, 1973. This application May 7, 1975, Ser. No. 575,379**
**Int. Cl.² H02P *1/44***
**U.S. Cl. 318—221 H** **4 Claims**



1. In an electric motor of the type responsive to a source of

A.C. voltage and having a nominal starting torque and a tapped winding, a torque demand thermal switch comprising a bi-metallic element and a heater coil in proximity thereto, said bi-metallic element having a normal position for connecting said heater coil and said entire winding in series across said source, said bi-metallic element having a second position for connecting the tapped portion only of said winding across said source, said heater coil causing said bi-metallic element to trip from said normal position to said second position in response to heat generated in said heater coil when said motor is unable to properly start or to properly continue running due to an abnormal load, said bi-metallic element being caused to thereafter cycle between said second and normal positions until said overload has been overcome.

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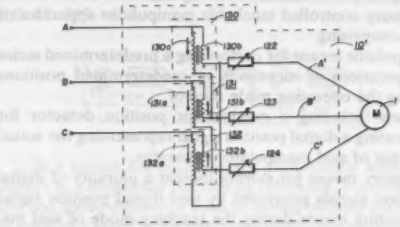
**4,025,834**

## NEGATIVE SEQUENCE COMPENSATION FOR POLYPHASE EQUIPMENT

**James E. McClain, and Howard L. Scott, both of Greenville, Tex., assignors to Esco Manufacturing Company, Greenville, Tex.**

**Filed May 22, 1975, Ser. No. 579,893**
**Int. Cl.² H02P 7/40**
**U.S. Cl. 318—228** **5 Claims**



**1.** In a system for supplying power by way of supply lines to a load from a polyphase voltage source, compensation apparatus for reducing or eliminating negative sequence currents in said load, said compensation apparatus comprising:

a. network means comprising at least first and second closed loops respectively disposed in two of said supply lines, each of said closed loops having parallel branches with a saturable reactor variable impedance element disposed in each of said parallel branches,

b. transformer means coupled between said polyphase voltage source and said network means, said transformer means comprising a plurality of potential transformers having respective primary windings connected across the input terminals of said three phase voltage source and secondary windings respectively electrically interconnected with the said primary windings as well as with the saturable reactors in each of said parallel branches, and

c. control means for adjusting the impedance of each of said variable impedance elements to null the negative sequence currents flowing in said load.

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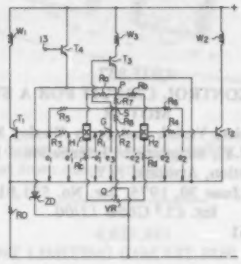
**4,025,835**

## THREE-PHASE BRUSHLESS DC MOTOR

**Kinzo Wada, Yokohama, Japan, assignor to Victor Company of Japan, Limited, Japan**

**Filed Sept. 5, 1975, Ser. No. 610,876**
**Claims priority, application Japan, Sept. 7, 1974, 49-102526**
**Int. Cl.² H02K 23/04**
**U.S. Cl. 318—254** **10 Claims**

**1.** A three-phase brushless DC motor having a permanent magnet rotor; three stator windings mutually displaced electrically by 120°; means for connecting in use said motor to a DC voltage source having a first and a second terminal; first and second Hall effect devices each connected to a corresponding one of the stator windings and mutually displaced electrically by $120° + (180° \times n)$ where $n$ is a whole number, said Hall effect devices having a pair of Hall voltage electrodes and a pair of control current electrodes, the stator windings having their one ends connected in common to the first terminal of the DC voltage source; first, second and third power transistors each having emitter, base and collector electrodes and a collector-emitter path, means for connecting the other end of each of the stator windings to the second terminal of the DC voltage source via the collector-emitter path of a corresponding one of the power transistors, connections connecting the



base electrode of the first and second power transistors to one of the Hall voltage electrodes of a corresponding one of said first and second Hall effect devices, and means for connecting the base electrode of the third power transistor to the other Hall voltage electrodes of said first and second Hall effect devices; and current regulating means; means for connecting in use one of the control current electrodes of said Hall effect devices to the first terminal of said DC voltage source via the current regulating means, and means for connecting in use the other control current electrode of said Hall effect devices to the second terminal of said DC voltage source.

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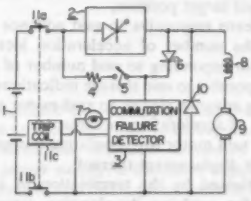
**4,025,836**

## PROTECTIVE SYSTEM AGAINST COMMUTATION FAILURE IN A CHOPPER CIRCUIT

**Shotaro Naito, Katsuta, and Hirosi Katada, Naka, both of Japan, assignors to Hitachi, Ltd., Japan**

**Filed July 3, 1975, Ser. No. 592,876**
**Claims priority, application Japan, July 5, 1974, 49-76304**
**Int. Cl.² H02P 7/12**
**U.S. Cl. 318—490** **11 Claims**




**1.** A protective system against a commutation failure in a chopper circuit provided for controlling the speed of an electric motor, said system comprising:

protective circuit means including means associated with the chopper circuit for detecting a commutation failure in said chopper circuit and means responsive to said commutation failure detecting means for breaking the main circuit including said electric motor from a power supply when a commutation failure takes place in said chopper circuit; and

means associated with said protective circuit means for

certifying the validity of said protective circuit means in such a manner that said certifying means applies a checking signal to said commutation failure detecting means when the check of the validity of said protective circuit means is required at any time desired, said checking signal being selected to correspond to a signal applied from said chopper circuit to said commutation failure detecting means when an actual commutation failure takes place in said chopper circuit.

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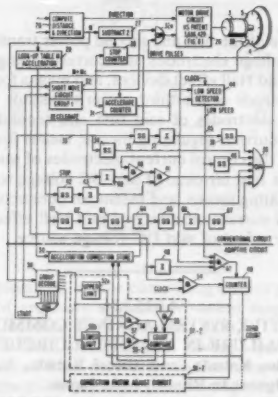
## 4,025,837
## ADAPTIVE CONTROL CIRCUIT FOR A STEPPING MOTOR

**Johann Hans Meier, Vestal, and Jerry Wesley Raider, Endicott, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed June 30, 1975, Ser. No. 591,810**
**Int. Cl.² G05B *13/00***
**U.S. Cl. 318—561** **10 Claims**



1. An adaptive control system for a stepper motor driving a load to a target position, comprising:

means for generating advance signals representative of the number of advance increments required for said motor to reach said target position;

storage means responsive to said advance signals for indicating the number of acceleration increments for said motor corresponding to said number of advance signals;

means responsive to said storage indications for sequentially applying advance signals to said motor according to said number of acceleration increments;

means on said motor for generating output signals proportional to displacement thereof;

means activated by the termination of said acceleration signals for applying deceleration signals to slow said motor to a predetermined speed;

means responsive to said advance increments and said output signals for applying stop signals to said motor;

means for counting displacement signals of said motor at said predetermined speed until the occurrence of said stop signal;

means operable at the conclusion of said counting for comparing said displacement signal count with predetermined values; and

means responsive to said comparison means for altering the number of said acceleration signal corresponding with said number of advance increments in said storage means.

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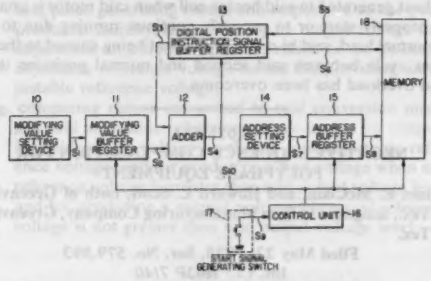
## 4,025,838
## SIGNAL MODIFICATION DEVICE FOR MEMORY CONTROLLED MANIPULATOR APPARATUS

**Takehiko Watanabe, Akashi, Japan, assignor to Kawasaki Heavy Industries, Ltd., Japan**

**Filed Dec. 26, 1974, Ser. No. 536,542**
**Int. Cl.² G05B *19/10***
**U.S. Cl. 318—568** **4 Claims**




1. A digital position instruction signal modification device for a memory controlled teachable manipulator apparatus of the type comprising

i. manipulator means for performing a predetermined series of operations in succession at predetermined positions during the operating made thereof,

ii. means including a manipulator position detector for generating a digital position signal representing the actual position of said manipulator apparatus,

iii. memory means for storing therein a plurality of digital position signals generated by said digital position signal generating means during the teaching mode of said manipulator apparatus as the digital position instruction signals to be used for causing said manipulator means to perform said predetermined series of operations, each of said position instruction signals being stored at a corresponding predetermined address within said memory means,

iv. comparator means for comparing the output signal from said memory means with the output signal from said digital position signal generating means in a motion reproduction mode of said manipulator apparatus to produce an output error signal proportional to the difference between said two output signals, and

v. manipulator apparatus driving means for driving said manipulator means in such a direction as to make said output error signal zero, thereby causing the position of said manipulator apparatus to correspond with the corresponding instruction signal, characterized in that said digital position instruction signal modification device comprises

a. a modifying value setting means coupled to said manipulator position detector for setting a modifying value for modifying a desired digital position signal stored in said memory means,

b. first buffer register means for storing therein said modifying value from said modifying value setting means,

c. address setting means for setting the address in said memory means of the digital position instruction signal to be modified,

d. second buffer register means for storing therein the output from said address setting means,

e. third buffer register means for storing therein the digital position instruction signal read out from said memory means in response to the output signal from said address setting means,

f. adder means for adding the modifying value from said first buffer register means to the digital position signal

from said third buffer register means, thereby modifying said digital position signal,

g. fourth buffer register means for storing therein the modified position signal and transferring the same to said memory means, and

h. manually operable control means operative at times other than during said operating and teaching modes of said manipulator apparatus for controlling the storage of signals in said first, second, third and fourth buffer register means and for controlling the position of said manipulator apparatus at such times.

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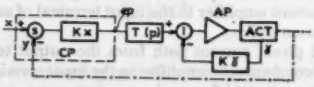
4,025,839

## DEVICE FOR AN ACCURATE CONTROL OF FINAL POSITIONING AND FOLLOW-UP OF A DISPLACEABLE MEMBER WITH RESPECT TO A REFERENCE

Christian Maury, Velizy, France, assignor to Compagnie Internationale pour l'Informatique, Louveciennes, France

Filed Apr. 29, 1975, Ser. No. 572,757
Claims priority, application France, May 6, 1974, 74.15600
Int. Cl.² G05D *23/275*
U.S. Cl. 318—632 6 Claims




1. In a system for positioning a displaceable member with respect to a constantly fluctuating reference, comprising position and speed difference sensors having outputs connected to an input of a servo-mechanism controlling the displacement of said member during sequentially operated coarse and fine positioning phases thereof, a device ensuring accurate final positioning and reference follow-up member which comprises combination of means responsive to a position difference threshold value in the signal outputting the position difference sensor, servo integral action correction means, servo frequency-limited amplitude and speed displacement correction means and switching means responsive to the activation of the said position difference threshold value responsive means for switching off the speed difference sensor from said servo-mechanism input and for switching in both said correction means between the output of the position difference sensor and the said input of the servo-mechanism.

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4,025,840

## PERMANENT MAGNET GENERATOR WITH OUTPUT POWER ADJUSTMENT BY MEANS OF MAGNETIC SHIMS

George Edward Brissey, and Elke Richter, both of Erie, Pa., assignors to General Electric Company, Wilmington, Mass.

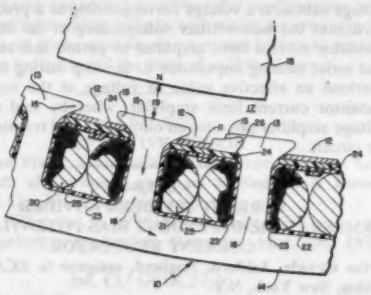
Filed Apr. 9, 1975, Ser. No. 566,380
Int. Cl.² H02P *9/40*
U.S. Cl. 322—52 2 Claims

1. In a permanent magnet generator, the combination comprising,

a. a permanent magnet rotor,

b. a stator having a plurality of slots and a plurality of windings disposed in said slots,

c. means for reducing the output from selected windings with increasing load including magnetically permeable means, which comprises a plurality of strips of magnetic material positioned in a selected slot for increasing the leakage flux and thereby the leakage inductance of the windings in the selected slot with increasing load to reduce the output of the selected winding without affecting the output from other windings.



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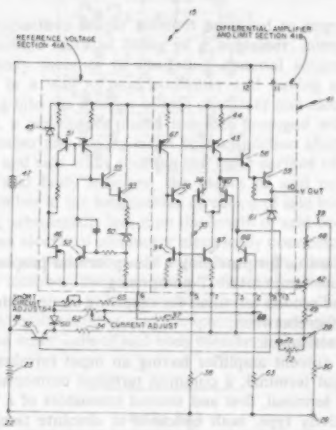
4,025,841

## CURRENT LIMITING CIRCUIT FOR VOLTAGE REGULATED POWER SUPPLY

Derek Chambers, Bedford, and Robert O. Pedersen, Amherst, both of N.H., assignors to Raytheon Company, Lexington, Mass.

Filed Nov. 10, 1975, Ser. No. 630,849
Int. Cl.² G05F *1/58*
U.S. Cl. 323—9 17 Claims




1. A voltage regulated power supply comprising a pair of load terminals for connecting a load to be supplied with regulated voltage, a series pass transistor connected to an input terminal of said power supply, a transistor regulator circuit, the control electrode of said series pass transistor being fed by the output of said regulator circuit, said regulator circuit including a differential voltage amplifier and a transistor current limit amplifier, said transistor current limit amplifier coupled to said differential voltage amplifier, a series sensing impedance connected in series with said series pass transistor and a load terminal, another input terminal connected to the other load terminal, means for applying voltage developed across said series sensing impedance to an input of said transistor current limit amplifier, said means including a diode and a first resistor of predetermined value connected from the current sensing input of said transistor current limit amplifier to the input side of said series sensing impedance and cooperating with a second resistor to form a voltage divider, the

junction of which is connected to the input of said transistor current limit amplifier in a manner so that prior to and during current overload of said power supply, diode conduction voltage subtracts a voltage corresponding to a predetermined portion of the base-emitter voltage drop at the input of said transistor current limit amplifier to permit less resistance in said series sensing impedance to develop during said current overload an effective value of voltage at the input of said transistor current limit amplifier, whereby said differential voltage amplifier provides an output for said transistor regulator circuit.

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**4,025,842**

## CURRENT DIVIDER PROVIDED TEMPERATURE-DEPENDENT BIAS POTENTIAL FROM CURRENT REGULATOR

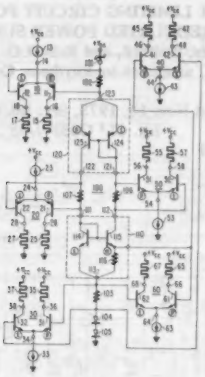
**Brian Crowle, Ashford, England, assignor to RCA Corporation, New York, N.Y.**

**Filed Jan. 7, 1976, Ser. No. 646,961**

**Claims priority, application United Kingdom, Feb. 24, 1975, 7658/75; Aug. 6, 1975, 7658/75**

**Int. Cl.² G01K *7/00*; G05F *3/08***

**U.S. Cl. 323—19** **11 Claims**



1. Apparatus for providing a bias potential proportional to an absolute temperature T comprising:

first and second terminals for receiving an operating potential therebetween;

a first resistance;

a first current amplifier having an input terminal and an output terminal, a common terminal connected to said first terminal, first and second transistors of a first conductivity type, both operated at absolute temperatures substantially equal to T, each of said first and second transistors having base and emitter electrodes with a base-emitter semiconductor junction therebetween, means galvanically coupling said first transistor collector electrode and said first current amplifier input terminal, means galvanically coupling said second transistor collector electrode and said first current amplifier output terminal, means consisting of a direct connection without substantial impedance between said first transistor emitter electrode and said first current amplifier common terminal, means direct coupling said first transistor collector electrode to said first transistor base electrode for applying direct coupled feedback to said first transistor to regulate the potential across its base-emitter junction to a value conditioning said first transistor for conducting substantially all of any current applied to said first current amplifier input terminal, a first resistance, and a series connection of said first resistance and said second transistor base-emitter junction, to which the regulated potential across the base-emitter junction of said first transistor is applied; and

a second current amplifier having a input terminal and an output terminal, a common terminal connected to said second terminal, third and fourth transistors of a second conductivity type complementary to said first conductivity type, each of said third and fourth transistors having a principal conduction path between first and second electrodes thereof and having a control electrode, the potential appearing between the control and first electrodes of each of said third and fourth transistors controlling the conduction of current in its principal conduction path, means direct coupling said second current amplifier input terminal to said third transistor control electrode, means galvanically coupling the first electrode of said third transistor to said second current amplifier common terminal, means galvanically coupling the second electrode of said third transistor to said second current amplifier input terminal, means direct coupling said second current amplifier input terminal to said fourth transistor control electrode, means galvanically coupling the first electrode of said fourth transistor to said second current amplifier common terminal, and means galvanically coupling the second electrode of said fourth transistor to said second current amplifier output terminal; and

means connecting said first and second current amplifiers in a regenerative feedback loop including:

a first direct current path from the output terminal of said first current amplifier to the input terminal of said second current amplifier;

a second direct current path from the output terminal of said second current amplifier to the input terminal of said first current amplifier; and

a second resistance included in one of the first and second direct current paths, said second resistance being in fixed ratio with said first resistance, the aforesaid connections of elements cooperating to cause the potential drop across said second resistance to be proportional to the absolute temperature T.

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**4,025,843**

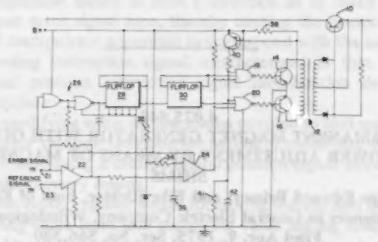
## CONSTANT CURRENT BASE-DRIVE CIRCUIT

**Francis F. Parker, Santa Ana, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Apr. 28, 1976, Ser. No. 680,944**

**Int. Cl.² G05F *1/56***

**U.S. Cl. 323—22 T** **6 Claims**



1. A control circuit for providing a constant current in a base drive circuit comprising:

a. circuit means for sensing a change in the base drive current;

b. means coupled to said circuit sensing means for generating an analog voltage proportional to the sensed change in current in said base drive circuit;

c. gate circuit means having first and second inputs connected for gating an input signal and a third input coupled

to said analog voltage generating means and being responsive to the analog voltage applied thereto for changing the amplitude of the signal gated by said gate circuit means for controlling the current in said base drive circuit.

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**4,025,844**

## GRANULAR SUPERCONDUCTING QUANTUM INTERFERENCE DEVICE AND APPARATUS INCLUDING SAME

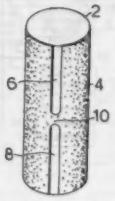
**Siegfried Guy Deutscher, Tel Aviv, Israel, assignor to Ramot University Authority for Applied Research and Industrial Development Ltd., Tel Aviv, Israel**

**Filed June 23, 1975, Ser. No. 589,463**

**Claims priority, application Israel, Apr. 24, 1975, 47165**

**Int. Cl.² G01R *33/02***

**U.S. Cl. 324—43 R** **14 Claims**




1. A superconducting quantum interference device characterized in that it includes two superconductor pathways connected together by a narrow bridge of a granular superconductor material having a high normal state electrical resistivity of about $10^{-4}$ to $10^{-3}$ ohm-cm.

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**4,025,845**

## SYSTEM WITH PHOTOCOUPLERS FOR AUTOMATIC CHECKING OF OPERATING THYRISTORS

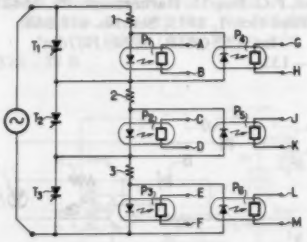
**Robert Lhommelet, Bois d'Arcy, and Jean-Paul Raynal, Fontenay sous Bois, both of France, assignors to Societe Generale de Constructions Electriques et Mecaniques(ALSTHOM), Paris, France**

**Filed Dec. 31, 1975, Ser. No. 645,908**

**Claims priority, application France, Jan. 31, 1975, 75.03067**

**Int. Cl.² G01R *31/02***

**U.S. Cl. 324—51** **4 Claims**




1. A device for automatic checking of operating thyristors comprising: current supply source with terminals; a plurality of networks connected in series between said terminals, each network comprising a thyristor and a series combination of a resistor and a first light emitting diode, said combination being in parallel with the said thyristor, the direction of conduction of said first light emitting diode being the same as that of said thyristor; a plurality of first photosensitive elements, each element having a pair of outputs and associated with a respective one of said first diodes; a second light emitting diode for each network and a second photosensitive element associated with said second light emitting diode, said second light emitting diode being connected in antiparallel configuration with the said first light emitting diode; and means for grouping the outputs of said photosensitive elements two by two to provide information indicative of the state of said thyristors.

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**4,025,846**

## CAPACITIVE SENSOR

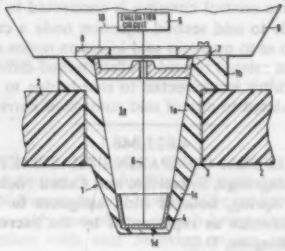
**Hans-Jürgen Franz, Schopfheim, and Werner Rottmar, Lorrach, both of Germany, assignors to Endress & Hauser Gmbh & Co., Maulburg, Germany**

**Filed Oct. 6, 1975, Ser. No. 620,083**

**Claims priority, application Germany, Mar. 28, 1975, 2448205**

**Int. Cl.² G01R *27/26***

**U.S. Cl. 324—61 P** **7 Claims**



1. A capacitive sensor element arranged to respond to a predetermined state of filling of a container, comprising a hollow body member of insulating material secured in an aperture in a wall of said container and having a portion projecting into the interior of said container and closed by an end wall, a pot-shaped metal member arranged within said body member and having a flat bottom portion abutting said end wall and side walls abutting the inner surface of the side walls of said body member, the extent of said pot-shaped metal member in the longitudinal direction of said body member being substantially less than the length of said body member, and an electrical conductor electrically connected to said pot-shaped metal member and extending longitudinally within said body member, the cross-section of said electrical conductor being very small in comparison with the internal cross-section of said body member, and the space between said conductor and the inner walls of said body member being occupied by air.

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**4,025,847**

## MEASUREMENT SYSTEM INCLUDING BRIDGE CIRCUIT

**Ralph G. Washburn, Marion, Mass., assignor to The Sippican Corporation, Marion, Mass.**

**Filed Aug. 27, 1975, Ser. No. 608,030**

**Int. Cl.² G01R *27/02***

**U.S. Cl. 324—65 R** **18 Claims**

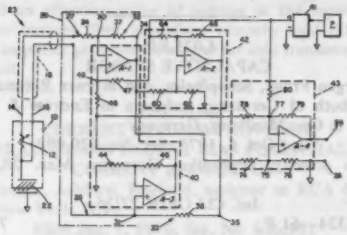
1. In a measurement system having a sensor the electrical resistance R, of which varies as a function of a parameter being measured, and a bridge circuit having said sensor and in a first arm connected to a first control node, a second arm connected to a second control node, and third and fourth arms respectively connected to said first and second nodes, that improvement wherein

said third bridge arm is connected between said first control node and a first current injection node,

said fourth bridge arm is connected between said second control node and a second current injection node,

a reference voltage source is provided,

first active control circuitry is connected to receive inputs from said first and second control nodes and from said voltage source, and to provide to said first injection node a current controlled so as to maintain said control nodes at a predetermined voltage difference related to the voltage at said source,



second active control circuitry is connected to said bridge to provide to said second injection node a current controlled so as to maintain said injection nodes at a voltage difference related to said predetermined difference, and output circuitry is connected to said bridge to provide an output related to one of said controlled currents.

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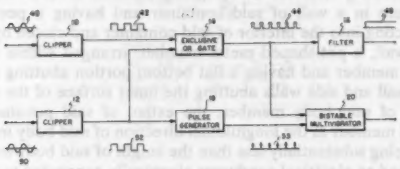
**4,025,848**

## WAVEFORM COMPARING PHASEMETER

**Arthur D. Delagrange, Sykesville, and Cabell Nicholas Pryor, Jr., Silver Spring, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Sept. 11, 1975, Ser. No. 612,409**
**Int. Cl.² G01R 25/00**
**U.S. Cl. 324—83 D** **16 Claims**




1. A circuit for measuring phase difference between a first input signal and a second input signal comprising:

first clipping means for limiting the amplitude of said first input signal and providing a first intermediate signal;

second clipping means for limiting the amplitude of said second input signal and providing a second intermediate signal;

first logic means coupled to said first and said second clipping means for receiving said first and said second intermediate signal and providing a first output signal having a logical "one" condition whenever said first and said second intermediate signals are of different amplitude and a logical "zero" condition whenever said first and said second intermediate signals are of the same amplitude whereby the duration of said logical "one" condition is proportional to the extent of said phase difference;

a pulse generator coupled to said second clipping means for providing an output pulse in response to a substantial change in amplitude by said second intermediate signal;

a bistable-multivibrator coupled to said first logic means and to said pulse generator for receiving said first output signal and said output pulse and maintaining a logical "one" sign state whenever said output pulse coincides with said logical "one" condition;

whereby said logical "one" sign state indicates that said second input signal leads said first input signal by not more than 180° of phase angle and said logical "zero" sign state indicates that said first input signal leads said second input signal by not more than 180° of phase angle.

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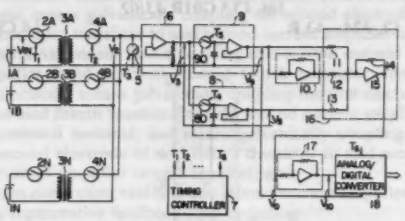
**4,025,849**

## METHOD OF MEASURING ANALOG INPUT VOLTAGES THROUGH ISOLATION TRANSFORMERS AND APPARATUS FOR THE SAME

**Yoshiyuki Nihashi; Ikuho Horinaka; Syuichi Senda, all of Hitachi; Kazuo Katou, Ibaraki, and Takashi Sase, Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Aug. 29, 1975, Ser. No. 609,021**
**Claims priority, application Japan, Aug. 30, 1974, 49-99630**
**Int. Cl.² G01R 1/20, 19/00**
**U.S. Cl. 324—127** **7 Claims**




1. A method of measuring analog input voltages through isolation transformers wherein each of said analog input voltages is applied across a primary winding of associated one of the isolation transformers through an input selection switch and a secondary winding of each of the isolation transformers is connected across the input of amplifier means, the improvement which comprises the steps of detecting voltages $V_A$ and $V_B$ developing across the secondary winding after elapses of time $T_A$ and $T_B$ ($T_A < T_B$), respectively, from closure of the input selection switch to apply an analog input voltage $V_{in}$ and calculating the analog input voltage $V_{in}$ from the values of $T_A$, $T_B$, $V_A$ and $V_B$ in accordance with the following equation:

$$V_{in} = V_B + \frac{T_B}{T_B - T_A} \times (V_A - V_B).$$

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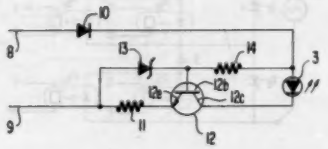
**4,025,850**

## PASSIVE, SOLID STATE WIDE RANGE VOLTAGE CHECKER

**Joseph Spiteri, P.O. Box 71, Harborcreek, Pa. 16421**

**Filed Oct. 1, 1975, Ser. No. 618,564**
**Int. Cl.² G01R 19/14, 19/16**
**U.S. Cl. 324—133** **7 Claims**



1. A passive total solid state pocket size voltage checker operative for testing voltages within a range of 3 to 250 volts comprising a housing, an indicating circuit within the housing comprising a rectifier, a resistor, a transistor, and an indicator in series with a pair of leads, said leads extending from the housing and having free ends provided with terminals for connection across an unknown voltage, said transistor having its emitter and collector in series with said resistor and said

indicator, and means connected in said circuit for limiting the sum of the voltage across the resistor plus the emitter to base voltage of the transistor, and the transistor sustaining all voltage in excess of the voltage drop across the indicator and resistor.

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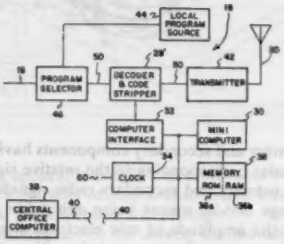
4,025,851

## AUTOMATIC MONITOR FOR PROGRAMS BROADCAST

Donald E. Haselwood, Clearwater, and Carl M. Solar, Largo, both of Fla., assignors to A.C. Nielsen Company, Northbrook, Ill.

Filed Nov. 28, 1975, Ser. No. 636,041
Int. Cl.² H04J 9/00
U.S. Cl. 325—31 36 Claims




22. The method of identifying coded broadcasts made of network affiliated broadcasting stations comprising the steps of:

periodically detecting a time varying code that changes in an expected manner associated with the coded broadcasts;

comparing predetermined portions of successively-detected codes;

storing a representation of the last detected code upon the occurrence of a change in the predetermined portion thereof that differs from an expected change;

providing indications of the time elapsed between the storage of successive representations; and

storing said indications.

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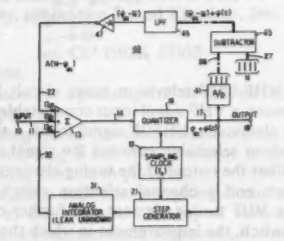
4,025,852

## METHOD AND ARRANGEMENT FOR CONTROLLING DELTA MODULATOR IDLE-CHANNEL NOISE

Yau-Chau Ching, Morganville, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 14, 1975, Ser. No. 622,084
Int. Cl.² H04B 15/00; H03K 7/00
U.S. Cl. 325—38 B 15 Claims




1. In combination,

means responsive to an input signal for generating a composite signal,

delta modulator means responsive to said composite signal for generating a delta-modulated signal,

means for deriving a first signal from said delta-modulated signal,

means for receiving a second signal representing a predetermined quantity, and

means for generating an offset signal including means for forming a difference signal indicative of the difference between said first and second signals and for amplifying the dc component of said difference signal, said composite signal generating means including means for varying said composite signal in response to said offset signal.

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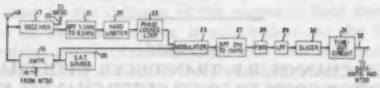
4,025,853

## METHOD AND APPARATUS FOR RADIO SYSTEM COCHANNEL INTERFERENCE SUPPRESSION

Eric John Addeo, Long Valley, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 12, 1976, Ser. No. 657,564
Int. Cl.² H04B 3/60, 15/00
U.S. Cl. 325—55 12 Claims



2. In a radio communication system,

means for receiving a plurality of signals having the same nominal frequency and having different tones modulated thereon, only one of said signals being desired for communication with said receving means, said receiving means providing at an output thereof one of said plurality of signals,

means coupled to said receiving means output for selecting sufficient band of signal frequencies to include all of said tones of the tone signal modulation to produce thereby a selected tone which is the one of said tones modulated on said one of said plurality of signals,

means for generating at least one reference tone, and

means, responsive to said selected tone signal in the output of said selecting means and to said reference tone, for producing a digital signal indicating the relative frequency spectral position of the selected tone signal with respect to said reference tone.

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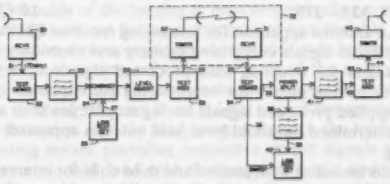
4,025,854

## IN-SERVICE TECHNIQUE FOR MEASURING TRANSMISSION CHARACTERISTICS OF A MICROWAVE RADIO LINK

John Willson Oades, Redwood City, Calif., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Sept. 26, 1975, Ser. No. 616,968
Int. Cl.² H04B 17/02, 1/00
U.S. Cl. 325—67 12 Claims



1. The method of measuring the transmission characteristics, such as group delay response, of an in-service microwave radio communication link (MRCL) carrying traffic signals,

said link comprising at least a single coordinated transmitter/-receiver pair, said method employing two tests signals, $f_{mod}$ and $f_{sw}$, in a two-tone test method in combination with a link test set transmitter/receiver, said method comprising the steps of:

filtering the traffic signals to attenuate the frequency $f_{mod}$;

combining the two test signals at the frequencies $f_{mod}$ and $f_{sw}$ from the link test set transmitter with said filtered traffic signal;

coupling said combined test and traffic signals to the MRCL transmitter;

removing said combined test and traffic signals from the MRCL receiver;

separating said combined test and traffic signals into a through-path signal and a test path signal;

filtering said test path signal and selecting therefrom said search test signal;

coupling said search test signal to the link test set receiver;

coupling said sweep test signal from the MRCL receiver to the link test set receiver; and

measuring the transmission characteristics with the link test set receiver.

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**4,025,855**

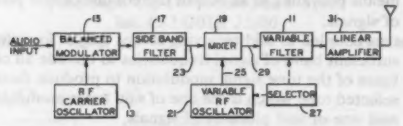
**MULTI-CHANNEL R.F. TRANSDUCER WITH CHANNEL SELECTOR COUPLED TO SELECTED CHANNEL FILTER**

**Lowell G. Atkinson, Indianapolis, Ind., assignor to General Aviation Electronics, Inc., Indianapolis, Ind.**

**Filed Apr. 30, 1976, Ser. No. 682,108**

**Int. Cl.² H04B 1/04**

**U.S. Cl. 325—137** **8 Claims**




1. In a multi-channel radio frequency transmitting device, a voltage variable filter circuit having a center frequency changeable with changes in the radio frequency channel selected for transmission comprising:

voltage variable reactive means;

means for changing the voltage across the reactive means to change the reactance thereof and therefore also change the center frequency of the filter including a plurality of voltage sources individually settable to desired levels; and

selector means for simultaneously selecting one radio frequency channel for transmission and one voltage source for application to the reactive means.

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**4,025,856**

**ANTENNA APPARATUS**

**Laurence A. Sode, 345 Fullerton Parkway, Chicago, Ill. 60614**

**Filed Feb. 23, 1976, Ser. No. 660,487**

**Int. Cl.² H01Q 7/08**

**U.S. Cl. 325—379** **10 Claims**

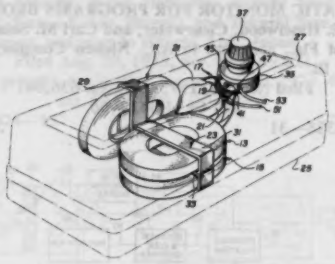
1. An antenna apparatus for processing received FM stereophonic radio signals comprising primary and secondary radio signals and for coupling said processed signals to a radio receiver having means for reproducing stereophonic sound from applied processed signals having amplitudes at or above a predetermined threshold level, said antenna apparatus comprising

means including first, second and third coils for intercepting said radio signals, each of said coils comprising a pair of parallel electrical conductors interconnected at one end;

means for holding said first coil and said second coil aligned in parallel spaced-apart planes and said third coil disposed adjacent the edges of said first coil and said second coil in a plane substantially normal to the planes of said first coil and said second coil; and

voltage divider means coupled to the other ends of each of said pairs of conductors so as to be coupled in parallel with each of said first, second, and third coils, said coils and said voltage divider means combining to convert said radio signals to electrical signals comprising corresponding primary and secondary components having respective amplitudes corresponding to the relative signal strengths of said primary and secondary radio signals,

said voltage divider means being adjustable to selectively reduce the amplitude of said electrical signals until said secondary components are below the predetermined threshold level of said radio receiver and said primary component exceeds said predetermined threshold level.



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**4,025,857**

**TELEVISION TUNER CIRCUIT**

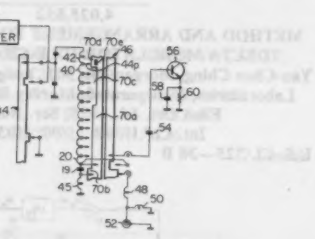
**Katsuhiko Miura, Soma, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan**

**Filed Mar. 17, 1975, Ser. No. 559,233**

**Claims priority, application Japan, Mar. 14, 1974, 49-29544[U]**

**Int. Cl.² H04B 1/06**

**U.S. Cl. 325—452** **8 Claims**




1. In a VHF-UHF television tuner circuit having a VHF tuning element, a VHF signal input connectable to the input of the tuning element, a UHF IF signal input, a signal output, a band switch to selectably connect the signal output alternatively to either the output of the tuning element or the UHF IF signal input, and a channel selection switch connected to control the VHF tuning element and further connected with the band switch, the improvement in which the channel selection switch has channel 2 attenuation means to set the VHF tuning element to one of the channels which is a channel other than channel 2 when the band and channel selection switches are set to their UHF positions and thereby attenuate the channel 2 VHF input signal component and prevent interference by said channel 2 signal component.

**4,025,858**

## LOCATING APPARATUS

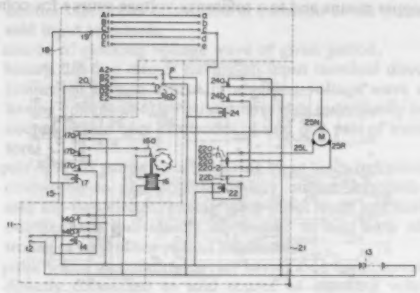
**Nobutoshi Ohuchi, Hojyo, Japan**

**Filed Jan. 15, 1975, Ser. No. 541,256**

**Claims priority, application Japan, Jan. 16, 1974, 49-8025**

**Int. Cl.² G05B *11/14***

**U.S. Cl. 318—673** **6 Claims**



1. A locating apparatus coupled to a movable mechanism moving among a plurality of positions to locate a desired one of the positions, the apparatus comprising:

at least one driving device for driving the movable mechanism;

a search position selecting device for selectively setting a desired one of the positions, the device having a plurality of contacts corresponding to the positions;

a start switch for starting the locating apparatus; and

a control circuit device for controlling the driving device in response to the operation of the start switch, the control circuit comprising a first means for searching the search position selecting device for one of the contacts which corresponds to said desired position, thereby to generate a drive signal upon finding said corresponding contact and further for generating operatively a specific signal, a second means for changing the polarity of the driving device in response to said specific signal from the first means, thereby to change the moving direction of said movable mechanism, and a third means for forming a circuit for the driving device in response to the drive signal from the first means.

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**4,025,859**

## DRIVE SYSTEM FOR SWITCHED INDUCTIVE LOADS PARTICULARLY FOR MULTI-PHASE STEPPING MOTORS

**Douglas A. Smith, Fife, Scotland, assignor to Burroughs Corporation, Detroit, Mich.**

**Filed Dec. 17, 1975, Ser. No. 641,401**

**Claims priority, application United Kingdom, Jan. 23, 1975, 2904/75**

**Int. Cl.² H02K *37/00***

**U.S. Cl. 318—696** **4 Claims**

1. A drive system for a plurality "n" of at least three inductive loads, comprising:

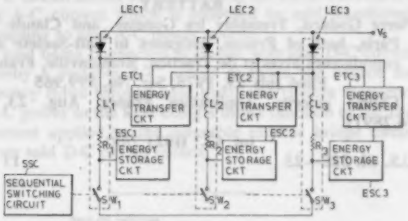
a load energizing circuit for each inductive load;

means for connecting a DC voltage source across all said load energizing circuits in parallel;

a switching device in each load energizing circuit selectively actuatable to energize the plurality of inductive loads according to a predetermined sequence.;

an energy storage circuit for each load energizing circuit and comprising a capacitor and a first diode for each inductive load, the capacitor being connected in parallel across its respective switching device via its respective first diode, the latter being poled to charge the capacitor by the reverse voltage accompanying the collapse of the magnetic field in its respective inductive load when the latter's switching device is switched-off;

and an energy transfer circuit for each load energizing circuit and comprising a plurality of "*n*-1" second diodes, one for and connected between the capacitor of its respective energy storage circuit and each of the other load energizing circuits, said second diodes being poled to




transfer the energy stored in the capacitor of one inductive load by the collapse of the magnetic field therein when its switching device is switched-on, to the load energizing circuit of the inductive load next switched-on by its switching device, to thereby enhance the build-up of current therein; each of said load energizing circuits further including a third diode poled to block the passage of said reverse voltage back to the DC voltage source.

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**4,025,860**

## CONTROL SYSTEM FOR BATTERY HYBRID SYSTEM

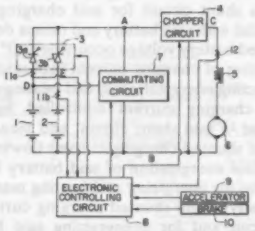
**Takanori Shibata, and Tsutomu Omae, both of Hitachi, Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan**

**Filed Sept. 15, 1975, Ser. No. 613,199**

**Claims priority, application Japan, Sept. 14, 1974, 49-105539**

**Int. Cl.² H02J *7/00*; H02P *1/00***

**U.S. Cl. 320—3** **11 Claims**




1. A control system for a hybrid battery power source having at least one energy battery of high energy density capable of discharging a small current over a comparatively long period of time and at least one power battery of high power density capable of discharging at least momentarily a comparatively large current for supplying current to a variable load, said control system comprising: controllable switch means for selectively connecting only one and both of the energy and power batteries in parallel across the load; means for monitoring the discharge current from at least one of the energy and power batteries, and the load current through the load; said monitoring means providing respective output signals in dependence on said load and discharge currents; means for controlling said switch means in dependence on said output signals to cause said switch means to connect both said energy and power batteries in parallel across the load when said load current is smaller than a fixed level and the dicharge current from the energy battery is below a fixed level, and to connect

only the power battery across the load when said load current is higher than a fixed level and the discharge current from the energy battery is at or above said predetermined level.

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**4,025,861**

## METHOD AND DEVICE FOR CHARGING AND HEATING AT LOW TEMPERATURE A SEALED STORAGE CELL BATTERY

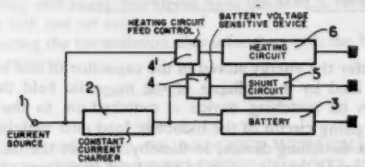
**Pierre Godard, Tremblay les Gonesse, and Claude Prevot, Paris, both of France, assignors to Saft-Societe des Accumulateurs Fixes et de Traction, Romainville, France**

**Filed July 29, 1975, Ser. No. 599,965**

**Claims priority, application France, Aug. 23, 1974, 74.28971**

**Int. Cl.² H02J 7/00**

**U.S. Cl. 320—23** **11 Claims**




1. Method for charging a sealed storage battery according to which the battery is heated when its temperature is situated below a determined value and the intensity of the charge current to the battery is reduced by shunting part thereof when the battery voltage reaches a predetermined given value which is selected such that it can be attained as a battery voltage only when the battery temperature is at 0° C or lower and whose value is higher than end of charge voltage of the battery at average 20° C temperature, characterized in that the said value of the battery voltage supplies the signal which starts said shunting to effect the heating of the battery.

7. A battery charging system for a sealed storage battery comprising means for supplying a direct charging current connected in series to said storage battery, heating means for said battery, a shunt circuit for said charging current connected in parallel with said battery and means dependent upon a predetermined battery voltage occurring at 0° C or lower for effecting shunting of charging current into said shunt circuit, means for effecting energization of said heating means for said battery with charging current controlled by intensity of shunted current in said shunt circuit, and means sensitive to the intensity of shunted charging current flowing in the shunt circuit to control energization of said battery heating means including means for energizing said heating means for a given value of intensity of the shunted charging current flowing in the shunt circuit and for deenergizing said heating means when said intensity is lower than said given value.

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**4,025,862**

## POWER SUPPLY WITH CHOPPING CIRCUIT

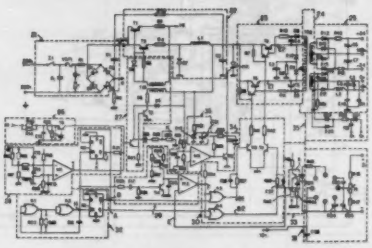
**Jean-François Gautheron, Grenoble, France, assignor to La Telemecanique Electrique, France**

**Filed Dec. 4, 1975, Ser. No. 637,606**

**Int. Cl.² H02P 13/22**

**U.S. Cl. 321—2** **3 Claims**

1. A power supply apparatus for providing a stabilised direct current output from an alternating current input, comprising: input filtering and rectifying means connected to the alternating current input and producing a rectified and filtered output, first chopper means for converting said rectified and filtered output to a periodic square wave signal having a variable mark-to-space ratio, said first chopper means having a control input and an output; first auxiliary rectifying and filtering means connected at the output of the first chopper means; second push-pull mounted chopper means connected to the first auxiliary rectifying and filtering means and providing a further square-wave signal having a variable mark-to-space ratio and a fixed repetition rate, said second chopper means having a control input and an output, a transformer having a primary winding connected to the output of the second chopper means and a secondary winding; output filtering and rectifying means connected to the secondary winding of the transformer; comparator means connected to the output of the first chopper means and to a reference voltage source for comparing the variations of the said square wave signal to a reference voltage and providing a control square wave signal having a variable mark-to-space ratio; means connecting the control square wave signal to the control input of the first chopper means; and further comparator means for comparing the variations of the stabilised direct current output to a further reference voltage and providing a further control square wave signal having a variable mark-to-space ratio and means connecting the said further control square wave signal to the control input of the second chopper means.



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**4,025,863**

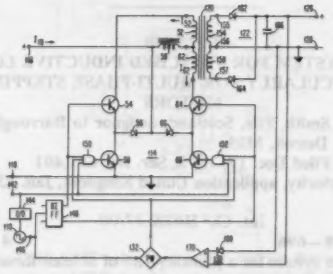
## REGULATING ELECTRIC POWER CIRCUIT ARRANGEMENT

**Hobart Atsushi Higuchi, and Lawrence Paul Trubell, both of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Aug. 4, 1975, Ser. No. 601,820**

**Int. Cl.² H02P 13/22**

**U.S. Cl. 321—18** **8 Claims**



1. A regulating electric power circuit arrangement comprising

input terminals at which direct energizing potential is applied,

output terminals at which alternating potential is delivered,

a transformer having a secondary winding connected to said output terminals and a primary winding having two terminals and a center tap,

an inductor connected between said center tap and one of said input terminals

one pair of transistors having collector electrodes individu-

ally connected to said terminals of said primary winding, and having base electrodes and emitter electrodes,

a pair of diodes having anode electrodes individually connected to said emitter electrodes of said one pair of transistors and having cathode electrodes conneced in common to said one input terminal,

another pair of transistors having collector electrodes individually connected to said emitter electrodes of said one pair of transistors, and having base electrodes, and having emitter electrodes connected in common to the other of said input terminals,

a source of clocking voltage wave of given period,

a binary flip-flop circuit having an input terminal directly connected to said source of clocking voltage wave and having complementary output terminals individually connected to said base electrodes of said one pair of transistors,

a pair of AND gating circuits having input leads individually connected to said complementary output terminals of said flip-flop circuit, having other input leads and having output leads individually connected to said base electrodes of said other pair of transistors,

a pulse width modulating circuit having one input terminal directly connected to said source of clocking voltage wave, a modulating input terminal and an output terminal connected in common to said other input leads of said AND gating circuits,

circuitry connected to said output terminals for generating a direct voltage proportional to said alternating potential thereat,

and a Zener diode having one terminal connected to said voltage generating circuit and having another terminal,

a differential amplifying circuit having complementary input terminals connected across said other terminal of said Zener diode and said direct voltage generating circuitry and an output terminal connected to said modulating terminal of said modulating circuit.

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## 4,025,864

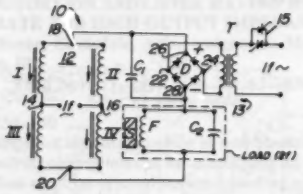
## DIRECT CURRENT MODULATOR FOR PROVIDING VARIABLE DOUBLE FREQUENCY ELECTRICAL POWER TO A LOAD

**Theodore R. Kennedy, Willingboro, N.J., assignor to Inductotherm Corporation, Rancocas, N.J.**

**Continuation-in-part of Ser. No. 227,751, Feb. 22, 1972, which is a continuation-in-part of Ser. No. 99,170, Dec. 17, 1970, abandoned. This application Aug. 4, 1975, Ser. No. 601,817**

**Int. Cl.² H05B** *5/06*

**U.S. Cl. 321—68** **10 Claims**




1. A direct current modulator for providing variable A-C power at twice the frequency of the power source to a load specifically adapted to operate at double the source frequency, comprising:

a load,

a saturable reactor bridge circuit having two or more windings wound on saturable magnetic cores, said saturable reactor bridge circuit including A-C power source input and output terminals,

said saturable reactor bridge circuit having impedance balanced windings to provide first and second zero A-C potential terminals in the absence of D-C magnetization current,

D-C circuit means transformer coupled to said A-C power source for providing a source of magnetization current derived from the A-C power to the first and second terminals of said saturable reactor bridge circuit so that said D-C current flows through said saturable reactor bridge circuit windings with an A-C power source current, said D-C circuit means also converting the current across it to an A-C current which is reflected by said transformer coupling to said A-C power source,

said load being connected in circuit with said D-C circuit,

whereby a variable A-C power at twice the source frequency flows through said load, said double frequency A-C power to the load being a direct function of the D-C current applied to the saturable reactor bridge circuit from said D-C circuit means.

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## 4,025,865

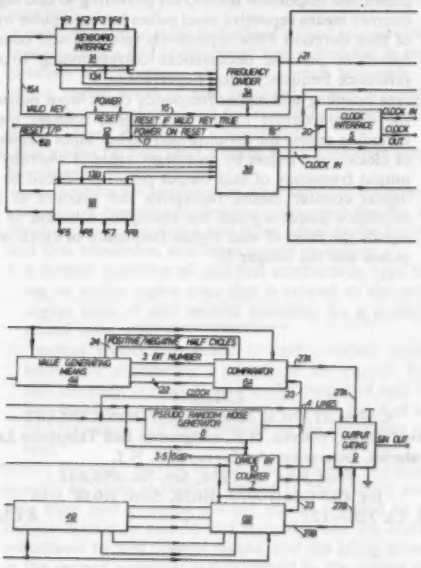
## FREQUENCY-SIGNALLING CIRCUIT FOR A TELEPHONE

**John Charles Munday, Cupar, and Andrew McDonald, Glenrothes, both of Scotland, assignors to General Instrument Corporation, Clifton, N.J.**

**Filed Jan. 8, 1976, Ser. No. 647,513**

**Int. Cl.² H03K** *3/84, 3/02*

**U.S. Cl. 328—14** **12 Claims**

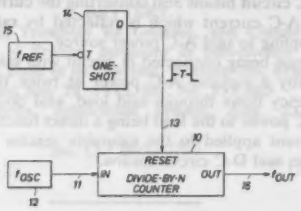



1. A circuit suitable for use in an *m* out of *n* frequency-signalling system, the circuit comprising: first input means for receiving a clock signal; second input means for receiving data defining *m* of said *n* frequencies; *m* channels coupled to the second input means for synthesizing respective ones of the *m* frequencies out of *n* possible frequencies, each channel comprising frequency division means coupled to the first input means for frequency division of the clock signal, the division ratio being selected in response to the said data received at the second input means; stochastic conversion means for converting the outputs of the frequency division means into pulse trains the repetition rates of which vary, respectively, at the *m* frequencies; and means for mixing the pulse trains by interleaving the trains in time.

## 4,025,866
## OPEN LOOP DIGITAL FREQUENCY MULTIPLIER

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of, and Robert Clark Moore, Laurel, Md.

Filed Nov. 10, 1975, Ser. No. 630,583
Int. Cl.² H03K 5/00, 21/32
U.S. Cl. 328—38 6 Claims




1. An open-loop digital frequency multiplier for multiplying a low frequency of clock pulses by a desired multiple M to produce high frequency output pulses which are synchronized to low frequency reference pulses, said multiplier comprising:

a source of clock pulses at a low reference frequency,

a source of higher frequency clock input pulses,

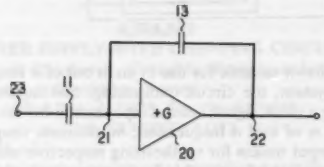
a multi-stage digital counter means which produces as its output said high frequency output pulses, reset means coupled to said source of reference frequency clock pulses and responsive thereto for providing to said digital counter means repetitive reset pulses having a pulse width of time duration $T$ for repetitively resetting said counter means as periodic occurrences corresponding to said reference frequency pulse occurrences,

means coupling said higher frequency clock input pulses to the digital counter means, said digital counter means including means for dividing said higher input frequency of clock input pulses by an integer value $N$ whereby the output frequency of said output pulses produced by the digital counter means represents the product of said reference frequency and the multiplier function $M$ and equals the ratio of said higher frequency of clock input pulses and the integer $N$.

## 4,025,867
## CAPACITANCE MAGNIFICATION CIRCUIT

Harold Seidel, Warren, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 16, 1976, Ser. No. 696,641
Int. Cl.² G06G 7/18; H03K 5/00; H03F 1/36
U.S. Cl. 328—127 8 Claims




1. A capacitance magnification circuit comprising:

a positive gain amplifier having an input port, and an output port;

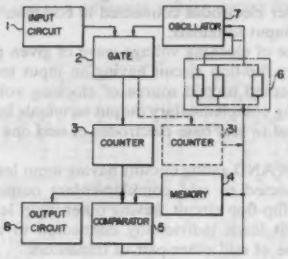
a first capacitor directly connected between said amplifier input port and said amplifier output port; and

a second capacitor connected between said amplifier input port and an input terminal of said magnification circuit.

## 4,025,868
## FREQUENCY DIGITAL CONVERTER

Masayuki Miki, Katsuta, and Nobukai Miyakawa, Hitachi, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Apr. 3, 1975, Ser. No. 564,921
Claims priority, application Japan, Apr. 5, 1974, 49-37920
Int. Cl.² G01R 23/02
U.S. Cl. 328—141 17 Claims




1. A frequency digital converter comprising:

input means for receiving an input signal whose frequency is to be measured;

an oscillator including frequency changing means for changing the oscillation frequency of said oscillator in a stepped manner, in accordance with a received instruction signal;

counting means connected to said input means and said oscillator for counting the output pulses of said oscillator during a time determined on the basis of said frequency of said input signal;

means connected to said counting means for producing said instruction signal having a value in accordance with a respective predetermined number of pulses corresponding to each oscillating frequency step of said oscillator;

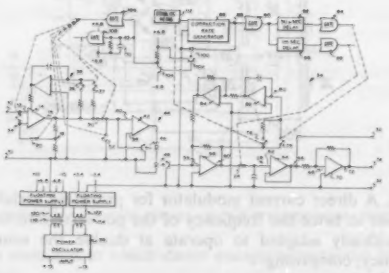
means for applying said instruction signal to said frequency changing means in said oscillator; and

digital output means for taking out the content of said counting means.

## 4,025,869
## SOLID STATE AMPLIFIER

Leland Bryan Smith, Arlington Heights, Ill., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Apr. 12, 1976, Ser. No. 676,014
Int. Cl.² H04B 1/12
U.S. Cl. 328—162 16 Claims



1. An improved solid state amplifier comprising:

a. solid state amplifier means having an input stage and an output terminal, said input stage having a pair of input terminals connected across a summing junction and a feedback terminal for a correction factor whereby a

feedback signal can be applied to said input stage to effect the balance across said summing junction;

b. input circuit means for connecting a signal to be amplified to one of said pair of input terminals;

c. signal feedback circuit means connected between said output terminal and the other of said input terminals, said signal feedback circuit means including a normally closed first switch means for periodically opening said signal feedback circuit means to disconnect the feedback signal therefrom;

d. normally open second switch means connected between said pair of input terminals for periodically interconnecting said pair of input terminals;

e. integrating circuit means for providing a correction factor connected between said output terminal and said feedback terminal for a correction factor, said integrating circuit means having an integrator with an input terminal and including a normally open third switch means disposed between said output terminal of said amplifier means and said input terminal of said integrator for periodically completing said connection to said output terminal;

f. track and hold circuit means having an input terminal and an output terminal for tracking a signal applied to said input terminal and holding the instantaneous value of said input signal at said output terminal when said input signal is interrupted;

g. connecting circuit means, including a normally closed fourth switch means interconnecting said output terminal of said amplifier means and said input terminal of said track and hold means;

h. means for generating a correction rate signal; and

i. first gate circuit means connected to said generating means and to said first, second, third and fourth switch means for periodically opening said first and fourth switch means and closing said second and third switch means placing the amplifier in a correction mode whereby the output of the amplifier will be maintained at its instantaneous value, said amplifier means will be put in a condition which will produce a zero output signal at said output terminal of said amplifier means if no unbalance across said summing junction is present, and the signal then present at said output terminal of said amplifier means will cause said integrating circuit means to integrate to a new correction factor level which will put said summing junction in a balanced condition.

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**4,025,870**

## LOW DISTORTION AMPLIFIER HAVING HIGH SLEW RATE AND HIGH OUTPUT IMPEDANCE

**John E. Hanna, Scottsdale, Ariz., assignor to Motorola, Inc., Chicago, Ill.**

**Filed Nov. 17, 1975, Ser. No. 632,436**
**Int. Cl.² H03F 1/34**
**U.S. Cl. 330—20** **14 Claims**

1. An amplifier circuit including in combination:

first electron control means for amplifying an input signal, said first electron control means including common base connected transistor means having an emitter electrode to which the input signal is directly applied, a collector electrode at which an output signal is created and a base electrode;

current turn-around means having an input terminal adapted to receive the signal from the first electron control means and an output terminal; and

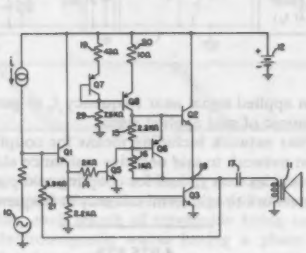
second electron means having a control electrode coupled to receive an output signal from said turn around means, a first electrode coupled to an output terminal for the amplifier circuit and a second electrode connected to provide negative feedback to said base electrode of said common base connected transistor means for stabilizing the magnitudes of the quiescent signals in the amplifier.

**4,025,871**

## AUDIO AMPLIFIER FOR INTEGRATED CIRCUIT FABRICATION HAVING CONTROLLED IDLING CURRENT

**William Peil, North Syracuse, N.Y., assignor to General Electric Company, Syracuse, N.Y.**

**Continuation-in-part of Ser. No. 435,450, Jan. 22, 1974, abandoned. This application June 26, 1975, Ser. No. 590,767**
**Int. Cl.² H03F 3/04**
**U.S. Cl. 330—22** **21 Claims**



13. An audio amplifier having minimum controlled idling current, comprising:

A. a common terminal and a non-common terminal for providing access to a source of bias potentials;

B. a constant current source coupled to the non-common terminal;

C. a push-pull output stage including first and second output transistors of a first conductivity type connected in series between said common and non-common terminals, the active region areas of said first and second transistors being approximately equal for exhibiting approximately equal current conduction characteristics;

D. first means for providing a signal for driving both output transistors;

E. second means for applying the drive signal to the input of said second transistor for causing conduction therein, and

F. third means for applying said drive signal to the input of said first transistors, said third means including:

1. a further transistor of said first conductivity type having an active region area that is related to the active region area of said second transistor by a predetermined ratio, and

2. control means connected to said constant current source for distributing a portion of the current from said constant current source to the output of said further transistor and another portion to the input of said first transistor and for withdrawing the remaining current;

whereby the input current to said first transistor and consequently its idling current is limited by the current available from said constant current source reduced by the output current in said further transistor and the current withdrawn by said control means, and the idling current in the second transistor is determined by the output current in said further transistor, being related thereto by approximately the ratio of the active region areas between said second and further transistors.

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**4,025,872**

## NEGATIVE RESISTANCE NETWORK

**Alfred I. Grayzel, Slope & Shore, New London, N.H. 03257**

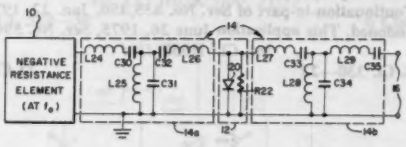
**Filed Aug. 1, 1975, Ser. No. 601,146**
**Int. Cl.² H03F 3/10**
**U.S. Cl. 330—34** **22 Claims**

1. A network having two terminals and characterized at said two terminals by a negative resistance at frequency near $nf_o$, where $n$ is an integer greater than 1, said network comprising in combination:

A. a negative resistance circuit element wherein the ratio of

the voltage applied across said element to the resultant current passing through said element is negative for applied voltages at frequencies in the range $f_1$ to $f_2$, wherein $f_1<f_o<f_2$,

B. a passive non-linear network including means responsive




to an applied signal near frequency $f_o$ to generate the $n^{th}$ harmonic of said applied signal,

C. a filter network including means for coupling said non-linear network to said negative resistance element only at frequencies near $f_o$, and for coupling said passive non-linear network to said terminals only at frequencies near $nf_o$.

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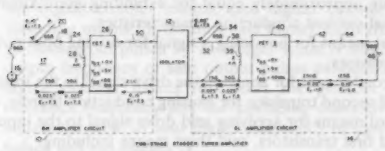
**4,025,873**

## BROADBAND, MICROWAVE, TWO-STAGE, STAGGER-TUNED, FIELD EFFECT TRANSISTOR AMPLIFIER

**Ronald L. Chilluffo, Springfield, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Aug. 17, 1976, Ser. No. 715,083**
**Int. Cl.² H03F 3/16**
**U.S. Cl. 330—35** **6 Claims**



1. A microwave integrated circuit amplifier for amplifying a wide bandwidth in the microwave region comprising:

microstrip means for providing distributed circuits for tuning;

first microwave FET means, including at least one microwave FET, connected to said microstrip and tuned by said microstrip to the upper cutoff of said bandwidth for providing a high-gain frequency response at the upper cutoff region of said bandwidth;

second microwave FET means, including at least one microwave FET, connected to said microstrip and tuned by said microstrip to the lower cutoff of said bandwidth for providing a high-gain frequency response at the lower cutoff region of said bandwidth; and

microstrip isolator means connected to said microstrip and further connected between said first and second microwave FET means for passing a signal in only one direction between said first and second microwave FET means.

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**4,025,874**

## MASTER/SLAVE CLOCK ARRANGEMENT FOR PROVIDING RELIABLE CLOCK SIGNAL

**Duane L. Abbey, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.**

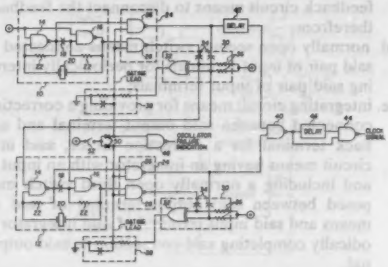
**Filed Apr. 30, 1976, Ser. No. 681,952**
**Int. Cl.² H03B 3/06**
**U.S. Cl. 331—55** **19 Claims**

1. A master/slave clock arrangement comprising:

a first oscillator for providing complementary signals;

first gating circuit means for passing the outputs of said first oscillator in response to an enable signal and inhibiting their passage in response to a disable signal;

first detector circuit means for detecting signal oscillations in both outputs of said first oscillator and for generating said enable and disable signals respectively when oscillations are present in both or less than both outputs, and



a second oscillator for providing complementary signals at a frequency like that of said first oscillator whose phase is controlled by the outputs of said first gating circuit means when it is enabled and which operates in a free-running mode when said first gating circuit means is disabled.

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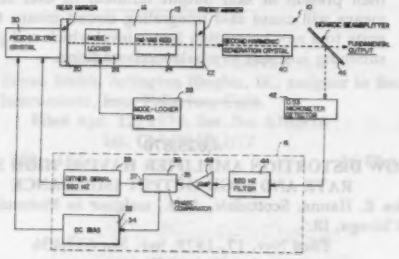
**4,025,875**

## LENGTH CONTROLLED STABILIZED MODE-LOCK ND:YAG LASER

**James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of, and John Sigfred Osmundson, Mount View, Calif.**

**Filed Jan. 5, 1976, Ser. No. 646,704**
**Int. Cl.² H01S 3/10**
**U.S. Cl. 331—94.5 S** **6 Claims**



1. A method of stabilizing the amplitude and repetition rate of a mode-locked pulse laser means, comprising the steps of:

time varying the length of a laser cavity in said laser means about a given equilibrium point in respone to a dither frequency signal;

converting a portion of the fundamental optical radiation of said laser into second harmonic optical radiation;

deriving a signal representative of the power of said second harmonic optical radiation at said dither frequency;

comparing the phase angle of said dither frequency signal which effects said laser cavity length variation with the phase angle of said representative of said second harmonic optical radiation power at said dither frequency; and

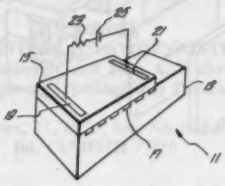
shifting said equilibrium point about which said laser cavity length is varied in response to a detected phase difference.

4,025,876

## DISTRIBUTED FEEDBACK ACOUSTIC SURFACE WAVE OSCILLATOR

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of, and Charles Elachi, Pasadena, Calif.

Filed Sept. 12, 1975, Ser. No. 613,004
Int. Cl.² H03B 5/32, 9/12
U.S. Cl. 331—107 A 5 Claims



1. Apparatus for generating oscillating acoustic surface waves having a wavelength λ, comprising:

a piezoelectric medium;

a semiconductor medium adjacent said piezoelectric medium;

a grating of individual, unconnected bars at the interface between said piezoelectric and said semiconductor medium, said grating bars being regularly spaced along said interface on centers at an interval of λ/2 in the plane of the interface; and

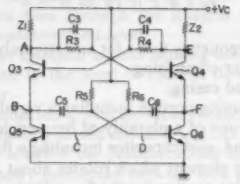
means attached to said piezoelectric medium for creating an electron drift therein parallel to the plane of the interface between said piezoelectric and said semiconductor medium and along the length of the interface, thereby establishing an oscillating acoustic surface wave travelling in the direction of the electron drift.

4,025,877

## MULTI-STAGE ASTABLE MULTIVIBRATOR

Hirohito Hara, Fujisawa, and Hironori Shimamura, Yokohama, both of Japan, assignors to Nippon Electronics Memory Industry Co., Ltd., Tokyo, Japan

Filed July 8, 1975, Ser. No. 594,113
Claims priority, application Japan, Dec. 26, 1974, 49-148285
Int. Cl.² H03K 3/282
U.S. Cl. 331—113 R 4 Claims



1. A multi-stage astable multivibrator comprising

a. first and second NPN transistors with the collectors of said first and second NPN transistors connected to the bases of the second and first NPN transistors, respectively, through a parallel circuit consisting of a resistor and a capacitor, and

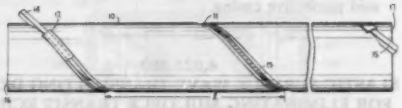
b. third and fourth NPN transistors with their collectors D.C. coupled to the emitters of said first and second NPN transistors, respectively, and with the collectors of said third and fourth NPN transistors connected to the bases of said fourth and third NPN transistors, respectively, through a capacitor and the bases of said third and fourth NPN transistors connected through resistors to a power supply.

4,025,878

## WAVEGUIDE COUPLER HAVING HELICALLY ARRANGED COUPLING SLOTS

Clayton Read Predmore, Amherst, Mass., assignor to Associated Universities, Inc., Charlottesville, Va.

Filed Mar. 8, 1976, Ser. No. 664,940
Int. Cl.² H01P 5/18
U.S. Cl. 333—10 16 Claims



1. A waveguide coupler for coupling energy between two lengths of waveguide through a coupling of their longitudinal magnetic fields, each length of waveguide being capable of supporting electromagnetic waves having a phase velocity different to the phase velocity of the waves supported by the other, the waveguide coupler comprising:

a circularly sectioned length of waveguide shaped and dimensioned to support a $TE_{nn}$ mode of wave propagation;

a further length of waveguide shaped and dimensioned to be capable of supporting a different order mode of wave propagation, said further length being capable of supporting waves having a higher phase velocity than said circularly sectioned length of waveguide and being helically wrapped around the outside of said circularly sectioned length of waveguide such that the magnetic fields of the electromagnetic waves are coupled between said circularly sectioned length and said further length; and,

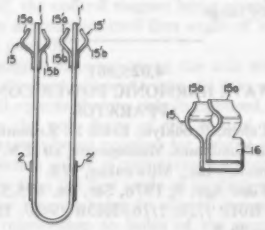
a plurality of apertures being provided along the contacting helical path between said circularly sectioned length of waveguide and said further length of waveguide such that said apertures open into the interior of both of said lengths of waveguide so as to enable coupling of energy between said two lengths of waveguide.

4,025,879

## ELECTROMECHANICAL REED FILTER

Toshiharu Tanaka; Naoteru Tsuda, and Kazuhide Arase, all of Kadoma, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Dec. 16, 1975, Ser. No. 641,271
Claims priority, application Japan, Dec. 26, 1974, 50-3211[U]; Jan. 25, 1975, 50-11506[U]; Feb. 18, 1975, 50-227724[U]
Int. Cl.² H03H 9/04; H04R 11/14, 17/10; H01L 41/10
U.S. Cl. 333—71 9 Claims



1. An electromechanical reed filter comprising:

a base member;

a protective casing mounted on said base member and defining therewith a housing;

a plurality of resonant reeds disposed within said housing, one end of each of said reeds being connected together and connected to said base member thereby mounting said reeds with their other ends free to undergo mechanical vibration and resonance;

a plurality of electromechanical transducers each adhered to respective ones of said reeds; and

shock-absorbing means disposed on each of said reeds in the vicinity of a free end of each of said reeds and deformable in at least two stages to stepwisely absorb external shocks being imparted to the filter for preventing cracking of said adhesive by preventing direct collision between said reeds and direct collision of said reeds with said protective casing.

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**4,025,880**

## ELASTIC SURFACE WAVE TRANSMITTING DEVICE FOR ELIMINATING MULTIPLE TRANSIT ECHOES

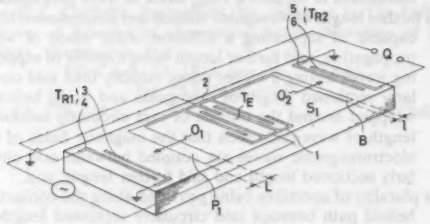
**Gerard Coussot, Paris, France, assignor to Thomson-CSF, Paris, France**

**Filed Apr. 27, 1976, Ser. No. 680,678**

**Claims priority, application France, Apr. 30, 1975, 75.13619**

**Int. Cl.² H03H** *9/04, 9/26, 9/32, 9/30*

**U.S. Cl. 333—72** **9 Claims**




1. An elastic surface wave transmitting device comprising a piezoelectric substrate and electromechanical transducer means arranged on the surface of said substrate, said means exchanging within an operating frequency range elastic surface wave energy, said transducer means comprising:

a transmitting transducer arranged at the centre of said substrate and including a pair of interdigitated comb-type electrodes; for radiating said elastic surface wave energy in opposite directions

two receiving transducers symmetrically arranged on either side of said transmitting transducer and respectively including a pair of interdigitated combtype electrodes for receiving said elastic surface wave energy;

phase-shift means causing the elastic surface wave transmitted by the transmitting transducer towards one of the receiving transducers to be substantially phase-shifted by $\pi/2$ for those frequencies lying within said operating frequency range.

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**4,025,881**

## MICROWAVE HARMONIC POWER CONVERSION APPARATUS

**Leonard D. Cohen, Brooklyn; Erich H. Kraemer, Huntington, and Shlomo Nussbaum, Massapequa, all of N.Y., assignors to Cutler-Hammer, Inc., Milwaukee, Wis.**

**Filed Apr. 9, 1976, Ser. No. 675,536**

**Int. Cl.² H01P** *1/20, 1/16;* **H03B** *19/00;* **H02M** *5/16*

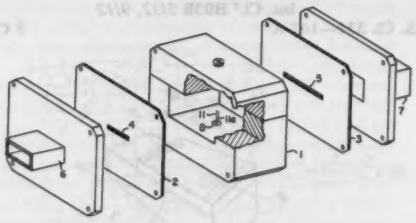
**U.S. Cl. 333—98 R** **3 Claims**

1. A microwave device for power conversion between harmonically related frequencies, comprising:

a. an enclosed conductive walled cavity that is oversized with respect to at least one of two frequencies between which conversion is to be effected,

b. a varactor diode,

c. an antenna element connected to said varactor and disposed within said cavity in dominant mode coupling relationship thereto and substantially adapted to impedance match said varactor to the cavity at said two frequencies,




d. means defining a first port in a wall of said cavity, said means being reflective at a first of said frequencies and transmissive at a second of said frequencies,

e. means defining a second port in a wall of said cavity, said means being reflective at said second frequency and transmissive at said first frequency, and

f. each of said ports being symmetrical with respect to the dominant mode field pattern of said cavity.

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**4,025,882**

## UHF TUNER HAVING FREQUENCY SETTING FINE TONED BY VARYING CHARACTERISTIC IMPEDANCE OF RESONANT LINE

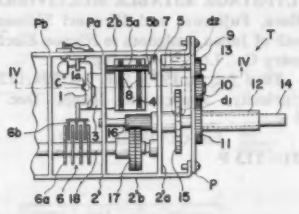
**Hiroshi Takeo, Yao, Japan, assignor to Sanyo Electric Co., Ltd., Osaka, Japan**

**Filed Nov. 17, 1975, Ser. No. 632,655**

**Claims priority, application Japan, Nov. 18, 1974, 49-133905**

**Int. Cl.² H03J** *3/10*

**U.S. Cl. 334—45** **10 Claims**




1. A radio frequency tuner for an extremely high frequency range said tuner comprising:

a. a grounded casing;

b. a rough tuning portion including a variable capacitor for tuning to one of a plurality of frequencies in a predetermined band, said capacitor including a fixed element and a movable element which rotates about an axis;

c. a fine tuning portion for the fine adjustment of the one of the plurality of frequencies to which said rough tuning portion is tuned, said find tuning portion comprising a distributed constant line including a resonant line having one end connected to said fixed element of said variable capacitor and the other end connected to said casing;

d. a conductor element movably disposed adjacent to said resonant line for selectively being driven toward and away from said resonant line to thereby vary the characteristic impedance of said distributed constant line to thereby finely adjust the tuned frequency;

e. a first rotary shaft means connected to said movable element and rotatably carried by said housing for adjusting the position of said movable element relative to said

fixed element to thereby vary the capacitance of said variable capacitor;

f. a second rotary shaft means coaxially and rotatably provided on said first rotary shaft means;

g. moving means operably coupled to said second rotary shaft means for moving said conductor element with respect to said resonant line upon the rotation of said second shaft means to thereby finely adjust the position of said conductor element.

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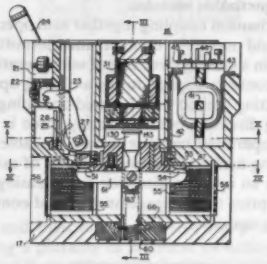
**4,025,883**

## MODULAR INTEGRAL MOTOR CONTROLLER

**Paul G. Slade, Pittsburgh, and John A. Wafer, Monroeville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Nov. 11, 1975, Ser. No. 630,874**
**Int. Cl.² H01H *77/10***
**U.S. Cl. 335—16** **16 Claims**



1. An integral motor starter comprising:

a housing;

a stationary contact;

a movable contact;

a disconnect switch mounted within said housing and connected in series circuit relationship to said stationary and movable contacts;

a movable contact arm having said movable contact mounted thereon, movable between a closed position, wherein said movable contact and said stationary contacts are in engagement, and an open position wherein said movable contact is spaced apart from said stationary contact;

magnetic drive means magnetically coupled to said contact arm for moving said contact arm to the open position when current flow through the integral motor starter exceeds a predetermined level;

a current sensor disposed in said housing and providing an output related to the level of current flow through the motor starter;

an operator connected to said movable contact arm controlling the positioning of said movable contact arm when the current flow is below the predetermined level; and

solid state circuitry connected between said current sensor and said operator for causing said operator to move said movable contact arm to the open position for overload currents below the predetermined level.

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**4,025,884**

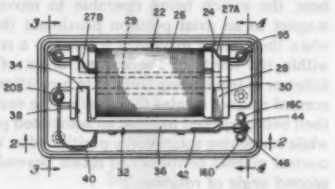
## RELAY CONSTRUCTION

**William Warren Wright, Wheaton; John J. Rowell, Glenview, and Edgar P. Canty, Elmhurst, all of Ill., assignors to Guardian Electric Manufacturing Company, Chicago, Ill.**

**Filed Oct. 16, 1975, Ser. No. 622,887**
**Int. Cl.² H01H *67/02***
**U.S. Cl. 335—129** **11 Claims**

1. An improved coil assembly and armature construction for a relay having one or more poles comprising, in combination:

a spool for receiving a coil, said spool being made from a non-conductive material and having a reduced cross-section center portion receiving a coil, opposed end flanges for retaining the coil, a hollow core for receipt of a magnetically conductive core field piece, and first and second secondary flanges spaced respectively from the end flanges, one pair of associated flanges defining a slot for receipt of at least part of the magnetically conductive



core piece and the other pair of flanges defining a slot for receipt of part of an armature;

an L-shaped armature projecting in part into one of said slots and extending the length of the center section to the other slot;

integral spring means and moving contact blade means attached to the armature and biasing the armature against magnetic force resultant from current through the coil; and

contact means for cooperation with said moving contact blade means.

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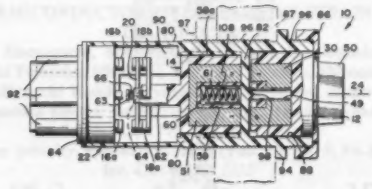
**4,025,885**

## SEALED PERMANENT MAGNET SWITCH

**Gabriel M. Giannini, 79-811 Ave.54, Indio, Calif. 92201**

**Filed June 27, 1975, Ser. No. 591,014**
**Int. Cl.² H01H *1/66***
**U.S. Cl. 335—154** **11 Claims**



1. A sealed rotary switch comprising:

a control magnet disposed along an axis with coplanar pole faces disposed adjacent one side of a thin nonmagnetic sealing wall, the control magnet being coupled for rotation within a predetermined first angle of rotation at a fixed axial position;

a follower magnet disposed along the axis with coplanar pole faces disposed adjacent a side of a thin, nonmagnetic sealing wall oposite the one side in opposed, facing relationship to the pole faces of the control magnet, the follower magnet being coupled for limited axial motion and for rotation within a predetermined second angle of rotation less than the first angle of rotation with poles of the follower magnet being in aligned opposite polarity attractive relationship to poles of the control magnet when both the control and follower magnets are in midpoints of their respective first and second angles of rotation;

at least one pair of switch contacts;

a conductive-bar resiliently coupled to the follower magnet to selectively close one pair of switch contacts when the

follower magnet is at a rotational limit and axially spaced from a nonmagnetic sealing wall;

a coil spring engaging the conductive bar at a midpoint therealong and resiliently coupling the bar to the follower magnet; and

a housing having a control chamber receiving the control magnet and a sealed follower chamber receiving the follower magnet, conductor and switch contacts, the housing having a nonmagnetic sealing wall extending between facing pole faces of the control and follower magnets and separating the control and follower chambers, the switch being operable to move the follower magnet to an axial position proximate the sealing wall when the control magnet is rotated to a rotational angle within the limits of the second angle of rotation, the follower magnet being rotated to a rotational limit as the control magnet rotates to a limit of the second angle and then being repelled to close an associated pair of contacts while remaining rotationally positioned at the limit as the control magnet continues to rotate beyond a limit of the second angle of rotation.

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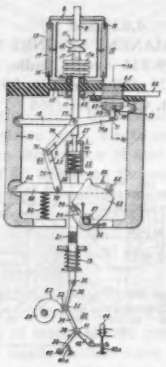
**4,025,886**

## ELECTRIC CIRCUIT BREAKER WITH ELECTRO-MAGNETICALLY-ASSISTED CLOSING MEANS

**Philip Barkan, Media, and William Thomas Sharp, Philadelphia, both of Pa., assignors to General Electric Company, Philadelphia, Pa.**

**Filed June 4, 1976, Ser. No. 693,060**
**Int. Cl.² H01H 3/42**
**U.S. Cl. 335—195** **7 Claims**



1. An electric circuit breaker comprising:

a. a first contact,

b. a second contact movable into engagement with said first contact to close said circuit breaker and movable out of engagement with said first contact to open the circuit breaker and interrupt the circuit therethrough,

c. an operating member for transmitting opening and closing forces to said movable contact,

d. electromagnetic-assist means for developing a magnetic closing force on said movable contact which varies directly in accordance with the current through said contacts, said electromagnetic-assist means comprising:

d1. a substantially rigid supporting member restrainable in a fixed position to render said electromagnetic-assist means capable of transmitting closing force to said movable contact and releasable to render said electromagnetic-assist means generally ineffective to transmit closing force to said movable contact,

d2. releasable latching means for normally restraining said supporting member in said fixed position when said contacts are engaged,

d3. a toggle having one end coupled to said supporting member and its opposite end coupled to said movable contact independently of said operating member, said toggle imparting a closing force to said movable contact when forced toward an in-line position while said supporting member is restrained in said fixed position,

d4. a conductor in series with said contacts for carrying current to and from said contacts,

d5. a member of magnetizable material forming a portion of a magnetic circuit for flux generated by current flowing through said conductor,

d6. a movable armature that is attracted to said magnetizable member with a force varying directly with current through said conductor, and

d7. a linkage interconnecting said armature and said toggle for forcing said toggle toward an in-line position in response to said armature's being attracted toward said magnetizable member,

e. a wipe mechanism coupling together said operating member and said movable contact and permitting limited overtravel in a closing direction of said operating member after said contacts engage during a closing operation and also permitting limited travel of said operating member in an opening direction before opening force is transmitted from said operating member to said movable contact,

f. and releasing means responsive to travel of said operating member in an opening direction for releasing said latching means prior to disengagement of said contacts during an opening operation.

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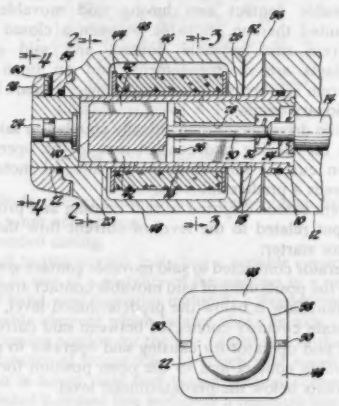
**4,025,887**

## AC SOLENOID WITH SPLIT HOUSING

**Julian R. Romans, Dearborn, Mich., assignor to Sperry Rand Corporation, Troy, Mich.**

**Filed June 27, 1975, Ser. No. 591,186**
**Int. Cl.² H01F 7/00**
**U.S. Cl. 335—278** **7 Claims**



1. A solenoid construction comprising a tube with an open and a closed end, a pole piece with a central passage fixed in the open end, a push rod in the central passage, an armature slidable in the tube toward and away from the pole piece, an energizing coil surrounding the tube, and a mechanically massive cover surrounding the coil and the tube, the cover comprising a plurality of monolithic sections of magnetically permeable material spaced only slightly from each other circumferentially around the tube and coil and together having a total magnetic reluctance substantially the same as the reluc-

tance of the pole piece, and means securing the sections in position around the tube and the coil.

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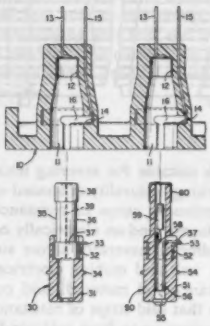
**4,025,888**

## FUSE AND VISUAL INDICATOR MOUNTING APPARATUS

**James Hewitt Judd, St. Charles, and Joseph Charles Manganello, Naperville, both of Ill., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Dec. 29, 1975, Ser. No. 645,247**
**Int. Cl.² H01H *85/32***
**U.S. Cl. 337—266** **6 Claims**



1. Fuse and indicator equipment comprising a mounting block having a plurality of identical mounting elements integrally formed therewith, each of said mounting elements having a first electrical contact at its base and an opening at the face of the block, a second electrical contact adjacent but removed from said face and means defining a key slot extending down from said face and then at right angles thereto to said second electrical contact;

a plurality of identically shaped electrical elements mounted in said mounting elements;

a first group of said electrical elements each comprising a fuse extending between said first and second contacts and having one end in contact with said first contact, a conductive lug connecting the other end of said fuse to said second contact in said key slot and a cover extending above the face of said mounting block; and

a second group of said electrical elements comprising a hollow nonconducting sleeve having a conductive cap at one end thereof engaging said first contact, a conductive lug in said key slot and engaging said second contact, a light emitting diode mounted in said hollow nonconducting sleeve above the face of said mounting block and connected to said conductive cap and to said conductive lug.

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**4,025,889**

## NON-RESETTABLE HEAT RESPONSIVE SAFETY SWITCH

**Gerhard Schwarz, Pforzheim, Germany, assignor to Firma Microtherm GmbH, Pforzheim, Germany**

**Filed Sept. 8, 1975, Ser. No. 611,430**
**Claims priority, application Germany, Sept. 19, 1974, 2444802**
**Int. Cl.² H01H *37/76***
**U.S. Cl. 337—408** **11 Claims**

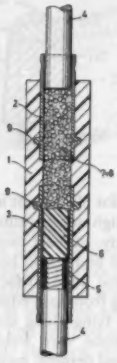
1. A non-resettable heat responsive safety switch breaking an established contact, when a critical temperature is reached or exceeded in the area of the switch, the latter comprising in combination:

a pair of tubular contact sleeves of electrically conductive material;

a non-conductive jacket holding the two contact sleeves in coaxial alignment with one another and axially spaced apart to form a gap between their inner ends;

a pair of lead-in wires attached to and electrically connected to the outer ends of the two contact sleeves;

a contact body arranged in the gap between the two contact sleeves, in a position in which it engages the extremities of both sleeves, thereby electrically bridging them, the contact body being displaceable from this position so as to interrupt the electrical contact between the two sleeves;



means for biasing the contact body in the sense of a displacement which causes said interruption of contact;

a temperature-responsive, normally solid trigger body cooperating with the contact body by holding it in place, in opposition to the biasing means, as long as the temperature remains below a predetermined level, and which, when heated to a higher temperature, softens and loses its capability of opposing the biasing means, allowing the latter to impart to the contact body said contact interrupting displacement.

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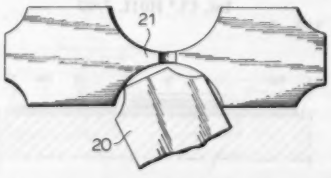
**4,025,890**

## SEMICONDUCTOR PIEZORESISTIVE STRAIN TRANSDUCER

**Youshi Hamaguchi, Mie; Noboru Yukami, Kawanishi; Tatsuyuki Tomioka, Hirakata; Yoshihito Shimizu, Shijonawate, and Hiroyuki Kondo, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Feb. 12, 1976, Ser. No. 657,622**
**Claims priority, application Japan, Feb. 18, 1975, 50-20518**
**Int. Cl.² G01L *1/22***
**U.S. Cl. 338—2** **2 Claims**



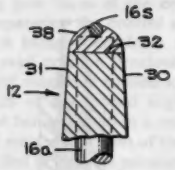
1. A semiconductor piezoresistive strain transducer having a reduced neck with an hour-glass configuration and two pads interconnected by said reduced neck, said transducer having opposite straight sides with recesses therein defining said reduced neck and said recesse having a shape which consists of a part of a circle, said pads having ends generally rectangularly shaped with the corner portions having the tips removed, the corner portions of the pads having a shape which, when inscribed in the recess, leaves the corner portions spaced from the reduced neck.

4,025,891

## METHOD FOR MAKING A HOT WIRE ANEMOMETER AND PRODUCT THEREOF

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of, and Volker Mikulla, am Buchenhain, Germany

Filed Nov. 10, 1975, Ser. No. 630,579
Int. Cl.² H01C 3/04
U.S. Cl. 338—28 7 Claims



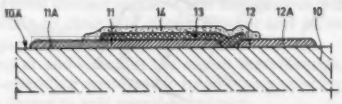

1. A hot wire probe for placement in a path for moving fluid comprising a rigid, high temperature resistant, electrically insulative ceramic body, at least two electrically conductive rods embedded in said body, said body defining at least one narrow substantially flat edge surface, said conductive rods having ends protruding from said edge surface in spaced apart relation, a probe wire lying along said edge surface with the extremities of said probe wire welded respectively to said protruding rod ends, and ceramic means for adhesively joining said probe wire to said edge surface, said adhesively joining means encasing all but a portion of the probe wire surface remote from said edge surface.

4,025,892

## PROBE FOR DETECTING GASEOUS POLAR MOLECULES SUCH AS WATER VAPOR

Jean Pompei, Noisy-le-Roi; Bernard Lacroix, Paris, and Francis Pierrot, Rueil-Malmaison, all of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 13, 1975, Ser. No. 577,068
Claims priority, application France, May 27, 1974, 74.18213
Int. Cl.² H01L 7/00
U.S. Cl. 338—35 6 Claims



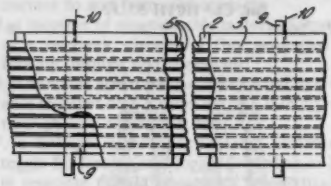

1. Probe for selectively detecting polar molecules in a gaseous mixture in contact with the probe, the operation of the probe being based on the variation of its electrical resistance due to a reaction at the probe surface, characterized in that it comprises a substrate on which is deposited a layer of a semiconductor material of thickness 0.05 to 0.08 μum to which are connected at least two electrodes and which is covered by a film of a dielectric material of thickness 0.01 to 0.04 μum at least part of which is active as a detection area.

4,025,893

## CONTINUOUS WEB CONSISTING OF RESISTANCE FOIL MATERIAL BETWEEN TWO INSULATING FOIL LAYERS AND METHOD FOR THE PRODUCTION OF SUCH WEBS

Hans Amund Bergersen, Oslo, Norway, assignor to Patentkonsortiet Robert Meinich & Co., Oslo, Norway

Continuation of Ser. No. 405,076, Oct. 10, 1973, abandoned.
This application Aug. 6, 1975, Ser. No. 602,189
Int. Cl.² H01C 3/06; H05B 3/34
U.S. Cl. 338—212 11 Claims



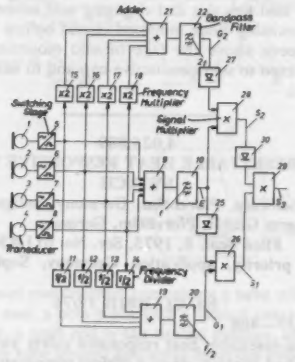

1. A flexible web suitable for severing into a plurality of heating mats comprising a plurality of spaced-apart longitudinally extending continuous strips of resistance foil material between insulating layers, and an electrically conductive continuous strip extending transversely across substantially the entire width of the web and making electrical contact with said strips of resistance foil material, said conductive strip being positioned so that said strips of resistance foil material extend in both directions away from said conductive strip for considerable distances, in which said transverse conductive strip is notched along two opposed edges thereof across said web in the areas thereof in registry with the spaces between adjacent ones of said resistance foil strips, the notches in one edge of said conductive strip being transversely offset from the notches in the opposed edge.

4,025,894

## METHOD AND APPARATUS FOR IMPROVING THE DIRECTIONAL CHARACTERISTIC OF AN ECHO SOUNDER RECEIVING BASE

Rolf Ziese, Worphausen, Germany, assignor to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed Mar. 9, 1976, Ser. No. 665,165
Claims priority, application Germany, Apr. 12, 1975, 2516001
Int. Cl.² G01S 7/66, 3/86; H04R 1/40
U.S. Cl. 340—3 R 7 Claims




1. A method for improving the directional characteristic of an echo sounder receiving base, comprising a plurality of transducers arranged in a plane, by way of multiplicative processing of output signals obtained from the signals received

by the transducers when utilizing a submarine sound wave generator with a constant transmitting frequency, said method comprising the steps of: deriving a plurality of output signals of different frequencies from each signal received by each transducer with the same frequency as the transmitting frequency, with one of said different frequencies being said transmitting frequency, another of said different frequencies being a higher frequency than said transmitting frequency and a further of said different frequencies being a lower frequency than said transmitting frequency; adding all of the output signals of the same frequency as said transmitting frequency to form a first group signal; adding all of said signals of said higher frequency to form a second group signal and all of said signals of said lower frequency to form a third group signal; multiplying said first and second group signals to provide a first product; multiplying said first and third group signals to form a second product; and multiplying said first and second products to provide a third product which is the desired directional characteristic.

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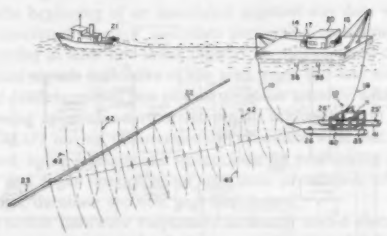
**4,025,895**

## NAVIGATION SYSTEM FOR MANEUVERING A STRUCTURE ABOUT A SUBMERGED OBJECT

**Harry Howland Shatto, Laguna Beach, Calif., assignor to Sante Fe International Corporation, Orange, Calif.**

**Filed Sept. 18, 1975, Ser. No. 614,734**
**Int. Cl.² G01S 9/68**
**U.S. Cl. 340—3 R** **12 Claims**



1. A method of locating a submerged acoustic reflecting object and maneuvering a water-borne structure about said object, comprising:

a. mounting two pairs of transducers stations on said structure;

b. transmitting acoustic impulses from one pair of transducers;

c. detecting with said one pair of transducers the resultant reflected acoustic impulses;

d. using a characteristic of the detected impulses to locate said object and to move said structure toward said object;

e. transmitting acoustic impulses from the other pair or transducers;

f. detecting with said other pair of transducers the resultant reflected acoustic impulses;

g. constructing a two-dimensional display based on the detected impulses from both pairs of transducers; and

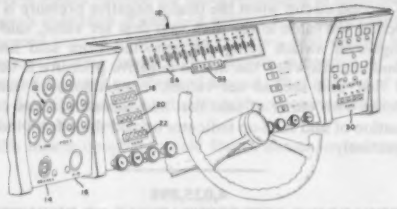
h. using the display to maneuver said structure about said object.

**4,025,896**

## ILLUMINATED DISPLAY SYSTEM AND METHOD OF WIRING SAID SYSTEM

**William Hintze, and Niels Junior Hansen, both of Camp Hill, Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed June 11, 1975, Ser. No. 585,908**
**Int. Cl.² B60Q 3/04**
**U.S. Cl. 240—8.16** **18 Claims**



1. A display panel comprising:

a rigid panel having at least one profiled aperture therein;

at least one layer of first flat flexible circuitry disposed on a first side of said substrate with portions of said circuitry extending into said at least one aperture; and

at least one indicating unit inserted in each said aperture to make mechanical and electrical contact with said flexible circuitry, each said unit including a housing, rigid support means, and a second flat flexible circuit comprising a metal conductor adhered to a flexible insulating substrate, at least one slot in said conductor and underlying substrate forming an open in said second circuit, electronic means inserted edgewise into said slot with the resiliency of said conductor and flexible substrate causing the conductor on opposite sides of the slot to make electrical contact with said electronic means which is supported therebetween, said second flat flexible circuit being folded on itself and supported by said rigid support means in said housing with a portion of said second flat flexible circuit extending therefrom to make contact with said first flat flexible circuitry disposed on said panel.

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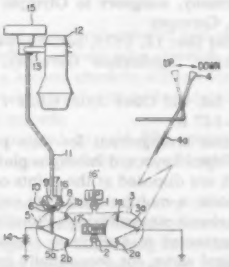
**4,025,897**

## SHIFT-TIME INDICATING SYSTEM

**Keiichi Kisuna, Nagoya, and Yasuyoshi Akamatsu, Okazaki, both of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed May 20, 1976, Ser. No. 688,402**
**Claims priority, application Japan, June 10, 1975, 50-70560**
**Int. Cl.² B60Q 1/00**
**U.S. Cl. 340—52 R** **7 Claims**



1. A shift-time indicating system comprising a first actuating circuit for a shift-up indicator and a second actuating circuit for a shift-down indicator, terminals of said first circuit and terminals of said second circuit being connected in parallel

through change-over switches respectively, one of said change-over switches being connected with said second circuit when a shift lever for a manually operated transmission is in a high speed position and connected with said first circuit when said lever is in a low speed position, the other change-over switch being operated in response to values of an intake negative pressure of an engine, said other change-over switch being connected with said first circuit when the intake negative pressure is higher than a first set value and connected with said second circuit when the intake negative pressure is below a second set value lower than said first set value, said other change-over switch being disconnected from said first and second circuits when the intake negative pressure is between said first and second set values, connections of said two switches with either of said first and second circuits causing actuation of said shift-up indicator or said shift-down indicator respectively.

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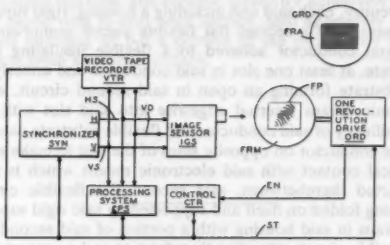
## 4,025,898
## RECORDING REPRESENTATIONS OF DISRUPTED SPACE PATTERNS

**Lew Shaw, 2955 Diamond Hill Road, Cumberland, R.I. 02864**

**Continuation-in-part of Ser. No. 572,132, April 28, 1975. This application Jan. 9, 1976, Ser. No. 647,658**

**Int. Cl.² G06K *9/00***

**U.S. Cl. 340—146.3 E** **7 Claims**




1. The method of recording a representation of a fingerprint comprising the steps of rotating through at least one complete rotation, a planar image of the fingerprint about an axis perpendicular to the planar image, generating Moiré patterns of the planar image of the fingerprint during rotation, converting the Moiré patterns to electrical signals, and storing representations of the electrical signals.

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## 4,025,899
## CIRCUIT ARRANGEMENT FOR DATA INPUT AND OUTPUT IN DATA PROCESSING DEVICES

**Michael Zander, Braunschweig, and Rudolf Schicht, Salzgitter, both of Germany, assignors to Olympia Werke AG, Wilhelmshaven, Germany**

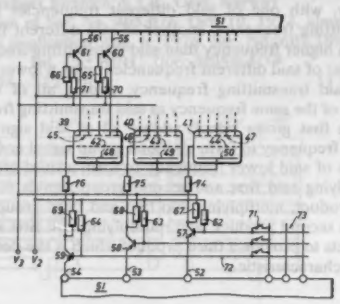
**Filed Dec. 18, 1975, Ser. No. 642,116**

**Claims priority, application Germany, Dec. 20, 1974, 2460486**

**Int. Cl.² G06F *3/02*; G02F *1/18***

**U.S. Cl. 340—147 R** **5 Claims**

1. In a circuit arrangement for data processing devices including: an input keyboard having a plurality of keyboard contacts which are disposed at the points of intersection of a conductor matrix; a multiposition data output device; electronic control circuit means having a plurality of outputs, each of which is connected to a separate position of said output device to control same, for sequentially providing a control signal at each of said outputs; means, connected to respective ones of said outputs and responsive to the control signal thereat, for applying an interrogation signal to a respective one of the row lines of said keyboard conductor matrix; and a decoder means connected to the column lines of said keyboard conductor matrix for evaluating the signals received via said column lines as a result of closed keyboard contacts as the input data for the data processing device; the improvement wherein said means for applying an interrogation signal comprises: a plurality of transistors each associated with a separate



one of said outputs, each said transistor having its emitter-collector current path connected between the associated said output and the associated said position of said data output device and its base connected to the associated row line of said keyboard conductor matrix.

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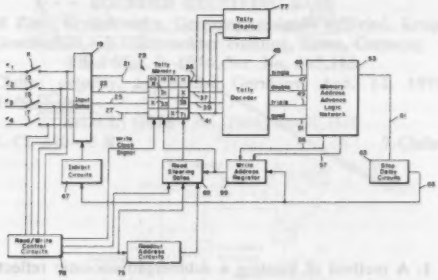
## 4,025,900
## RACE TALLY APPARATUS

**James A. Miller, Chatsworth, Calif., assignor to Bell & Howell Company, Chicago, Ill.**

**Filed June 3, 1976, Ser. No. 692,499**

**Int. Cl.² G06F *15/06*, *15/44***

**U.S. Cl. 340—172.5** **17 Claims**




1. Apparatus for tallying the finish results of a plurality of racing members having properties for being raced between a starting line and a finish line, including:

sensor means for individually sensing the arrival of the racing members at the finish line and for providing finish information in response to the arrival of each of the racing members at the finish line;

means responsive to the finish information for tallying the finish sequence of the racing members, the tallying means being responsive to an associated pair of the racing members finishing within a predetermined time interval for tallying the associated racing members in the finish position; and

means coupled to the tallying means for visibly displaying the finish sequence of the racing members, the display means including means for visibly displaying the associated racing members in the same finish position.

4,025,901

# DATABASE INSTRUCTION FIND OWNER

Charles W. Bachman, Lexington, and Benjamin S. Franklin, Cambridge, both of Mass., assignors to Honeywell Information Systems, Inc., Waltham, Mass.

Filed June 19, 1975, Ser. No. 588,434
Int. Cl.[2] G06F 9/20, 9/16, 13/00
U.S. Cl. 340—172.5 10 Claims

1. In an internally programmed data processing apparatus having a memory comprised of a plurality of segments of addressable space, each segment being associated with a segment number for addressing said associated segment, each of said segments delineated by upper and lower variable bounds with predetermined ones of said segments storing a plurality of files of database records grouped in sets of database records, each set of database records having at least one owner database record and at least one member database record, each of said database records having at least one pointer for linking predetermined ones of said database records to predetermined others of said database records and also to predetermined ones of said sets, each pointer comprised of an area, page and line address, said area address for locating a predetermined file of said database records, said page address for locating a predetermined group of said database records within said file, and said line address for locating a predetermined one of said database records, each of said database records also being associated with one each of a record descriptor for describing said associated database record, said record descriptors being stored in predetermined seconds of said segments, each of said sets also being associated with one each of a set-descriptor for describing said associated set and for providing a displacement address of said pointer in a first record of said set of associated records, said set descriptors being stored in predetermined thirds of said segments; said data processing apparatus further having a system base from which absolute addresses of said segments, database records and descriptors are referenced, said data processing apparatus also having a plurality of base registers, each base register for storing first coded electrical signals indicative of the segment number of any of said segments and also storing second coded electrical signals indicative of an offset address associated with the segment number, said offset address for addressing from the beginning of an associated segment any data within said associated segment; said data processing apparatus further having at least one index register for storing third coded electrical signals indicative of the area, page and line address of said predetermined one of said database records; said data processing apparatus further having an arithmetic and logic unit (ALU) having communication channels with said base registers, index registers and system base for performing arithmetic and logic operations of any data or address of said segments, database records, and descriptors;

instruction hardware responsive to fourth coded electrical signals indicative of a find owner instruction for finding the owner record (i.e. said predetermined one of said database records) of said predetermined first of said database records, said find owner instruction having a first base register address (BR) for identifying a first of said plurality of base registers storing fifth coded electrical signals indicative of a first segmented address of said predetermined first of said database records, said first segmented address comprised of a first segment number in a first offset address of said predetermined first of said database records, and said find owner instruction further having a first address syllable for identifying a second of said base registers for providing a second segment number and second offset address of the set descriptor associated with said predetermined first of said database records, said instruction hardware comprising:

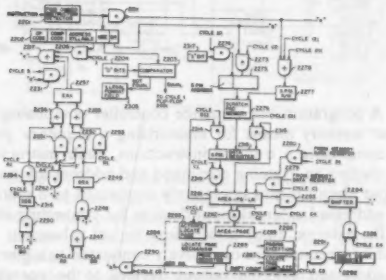
a. first means coupled for being responsive to coded electrical signals stored in said first base register for fetching said fourth coded electrical signals indicative of said first segmented address into said arithmetic and logic unit;

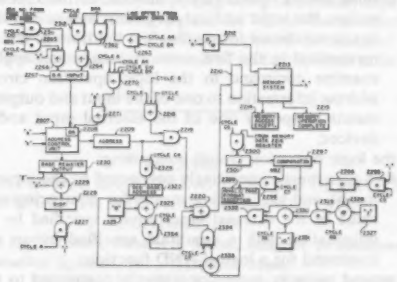
b. second means coupled to said first means for converting the fourth coded signals indicative of said first segmented address into seventh coded signals indicative of a first absolute address for locating said first of said database records relative to said system base;

c. third means coupled to said second means for fetching eighth coded signals indicative of said first of said database records into said arithmetic and logic unit (ALU);

d. fourth means coupled for being responsive to ninth coded signals indicative of said first address syllable for identifying said second of said base registers, said second base register storing tenth coded signals indicative of said second segment number and second offset address of said set descriptor associated with said predetermined first of said database records;

e. fifth means coupled to said fourth means or converting





said tenth coded signal indicative of said second number and second offset address into eleventh coded signals indicative of a second absolute address for locating said set descriptor associated with said predetermined first of said database records;

f. sixth means coupled to said fifth means for fetching twelfth coded signals indicative of said set descriptor into said ALU;

g. seventh means coupled for being responsive to thirteenth coded signals indicative of the displacement address in said set descriptor for addressing from the beginning of said first of said database records, an owner pointer of said pointers in said first of said database records; and,

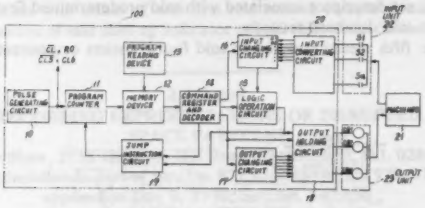
h. eighth means coupled to said seventh means for fetching fourteenth coded signals indicative of said owner pointer into said index register.

4,025,902

## GENERAL PURPOSE SEQUENCE CONTROLLER

Hisaji Nakao; Katutoshi Naruse; Kazuhiko Hasegawa, all of Toyota; Sadao Kawade; Yasufumi Tokura, both of Kariya, and Kazuo Matsuno, Gifu, all of Japan, assignors to Toyoda Koki Kabushiki Kaisha, Japan

Continuation of Ser. No. 381,622, July 23, 1973, Pat. No. 3,832,696. This application June 13, 1974, Ser. No. 479,039
Claims priority, application Japan, July 31, 1972, 47-76721
The portion of the term of this patent subsequent to Sept. 3, 1991, has been disclaimed.
Int. Cl.[2] G06F *3/00, 9/06, 15/46*
U.S. Cl. 340—172.5 8 Claims



1. A programmable sequence controller comprising:

first memory means for memorizing a sequence program comprising a train of instructions, each instruction including an examine command and address information;

input circuit means operatively connected to a plurality of addressed external input devices for converting states of the external input devices into logical values;

output circuit means operatively connected to a plurality of addressed external output devices to be energized or deenergized;

a logic operation circuit operatively connected to the input and output circuit means;

reading means operatively connected to the first memory means, the input and output circuit means and the logic operation circuit for reading out the train of instructions memorized in the first memory means and applying an examine command to the logic operation circuit and address information to one of the input and output circuit means to specify one of the external input and output devices;

the logic operation circuit comprising:

first gate means operatively connected to the input circuit means and the reading means for comparing a logical value of the external input device specified by address information with a condition specified by an examine command for a logical AND function;

second memory means operatively connected to the first gate means for memorizing a comparison result of the first gate means;

second gate means operatively connected to the input circuit means and the reading means for comparing a logical value of the external input device specified by address information with a condition specified by an examine command for a logical OR function;

third memory means operatively connected to the second gate means for memorizing a comparison result of the second gate means; and

identifying circuit means operatively connected to the second and third memory means for identifying the comparison results of the first and second gate means in accordance with the contents of the second and third memory means;

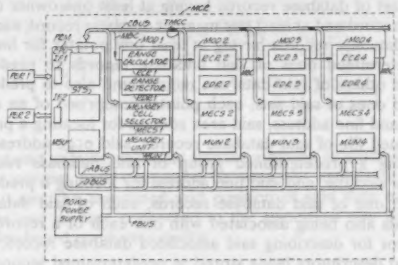
the output circuit means being operatively connected to the identifying circuit means and operable to energize or deenergize one of the addressed external output devices in response to an output of the identifying circuit means in the logic operation circuit.

4,025,903

## AUTOMATIC MODULAR MEMORY ADDRESS ALLOCATION SYSTEM

Phillip A. Kaufman, Irvine; Kenneth C. Gorman; George C. Henry, both of Mission Viejo, and Roy Blacksher, Santa Ana, all of Calif., assignors to Computer Automation, Inc., Irvine, Calif.

Filed Sept. 10, 1973, Ser. No. 395,548
Int. Cl.[2] G06F *13/06;* G11C *5/06, 7/00, 9/00*
U.S. Cl. 340—172.5 43 Claims



1. In a digital computer having a processing unit and a system for selectively addressing individual memory cells of a memory bank having a series of separate memory units, each said memory unit containing a number of such memory cells, for storing information in or for reading out information from each cell in accordance with a corresponding selectable absolute adress signal generated by said processing unit to represent the absolute address thereof corresponding to said each cell, the combination of:

a plurality of signal sources for providing signals representative of the number of memory cells in the respective memory units, said signal sources being associated with said memory units on a one-to-one basis;

starting address means for establishing a fixed starting address for the first memory unit in the series and for generating a signal representing said starting address;

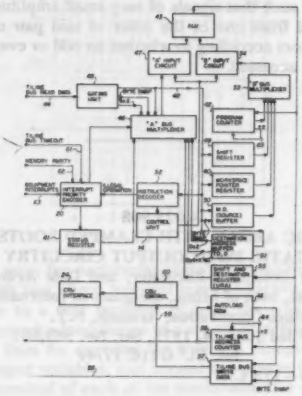
a plurality of calculating means associated with said memory units on a one-to-one basis, each such calculating means being controlled by the signal source of the associated memory unit and in accordance with a starting address signal of the associated memory unit for establishing a unique ending address for said associated memory unit, and for generating a signal representing said unique ending address, each such calculating means but the last also being controlled by the signal source of the corresponding memory unit and in accordance with the starting address signal of the associated memory unit for establishing a starting address for the next memory unit in the series, whereby a local address range is established for each said memory unit, and the absolute address is established for each cell in each said memory unit; and

a plurality of range detectors associated with said memory units on a one-to-one basis, each such range detector being responsive to a signal generated by said processing unit to represent a selected absolute address and also responsive to the starting and ending address signals of the associated memory unit, for enabling said memory unit to select a memory cell corresponding to said selected address only when said selected absolute address lies within the local address range of said memory unit.

## 4,025,904
## PROGRAMMED ALLOCATION OF COMPUTER MEMORY WORKSPACE

Eugene M. Adney, and Michael E. Thompson, both of, Houston, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 408,149, Oct. 19, 1973, abandoned. This application Sept. 8, 1975, Ser. No. 611,477
Int. Cl.² G06F 9/00
U.S. Cl. 340—172.5 5 Claims



1. In operation of a programmable computer the method which comprises:

a. storing in a first register the address of a first element of a set of dedicated workspace elements in main memory;

b. storing in a second register the memory address of a current instruction;

c. maintaining in a third register the current status of execution of the program of which said instruction forms a part;

d. utilizing as problem program workspace said set of workspace elements;

e. upon occurrence of an interrupt transferring the contents of said first register into a temporary store;

f. entering into said first register the address of a first element of a second set of dedicated workspace elements; and

g. storing the contents of said temporary store and of said second and third registers in elements of said second set.

## 4,025,905
## SYSTEM FOR ON-LINE PROCESSING OF BANKING TRANSACTIONS

Richard A. Gorgens, Bedford, Mass., assignor to Incoterm Corporation, Wellesley Hills, Mass.

Filed Nov. 28, 1975, Ser. No. 635,894
Int. Cl.² G06F 3/04
U.S. Cl. 340—172.5 6 Claims

1. A branch banking system for on-line processing of banking transactions comprising:

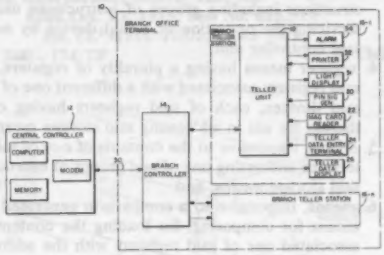
A. a central controller for maintaining transaction records and customer account data,

B. a plurality of remote branch controllers, each of said branch controllers being coupled by a communication channel to said central controller,

C. a plurality of branch teller stations associated with and coupled to each branch controller, each branch teller station including a teller unit having an associated set of activatably peripheral units, each of said peripheral units being connected through an associated multiple bit data channel to said teller unit and being characterized by having a minimum period during which single character data is inserted on said associated data channel after any activation of said peripheral unit, said teller unit including;

i. an output register and a switching network connecting each of the peripheral unit multiple bit data channels to said output register, said output register having at least two excess bit positions more than the maximum number of bits in any of said data channels, and

ii. means for operating said switching network to sequentially connect each of said peripheral unit multiple bit data channels having data therein to said output register, and for providing in said excess bit positions in said output register, information indicating which of said



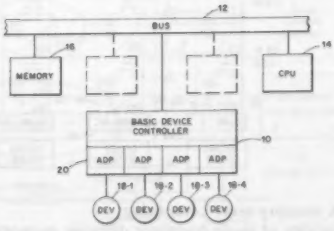
peripheral unit data channels is connected, and further for operating said switching network to couple the next sequential peripheral unit data channel having data therein to the output register only when said output register is empty,

wherein each of said branch controllers includes means for continuously polling in a predetermined sequence its associated teller units for uniform polling periods to read out the single character data in said output registers of each of said teller units, the frequency of polling being sufficiently high so that the composite polling period for all of the associated teller units is less than said minimum period for insertion of said single character dta from one of said peripheral units.

## 4,025,906
## APPARATUS FOR IDENTIFYING THE TYPE OF DEVICES COUPLED TO A DATA PROCESSING SYSTEM CONTROLLER

Douglas L. Rilkonen, Westford, Mass., assignor to Honeywell Information Systems, Inc., Waltham, Mass.

Filed Dec. 22, 1975, Ser. No. 643,423
Int. Cl.² G06F 3/04
U.S. Cl. 340—172.5 12 Claims




1. Data processing apparatus comprising:

A. a plurality of devices, each of said devices having a unique identification code for identifying the type of device;

B. a controller unit for controlling the operation of said devices;

C. means for coupling each of said devices to any one of a plurality of couplings of said controller unit;

D. means for transferring the identification code of a said device, by means of said means for coupling, to said unit;

E. said controller unit comprising

1. means for providing a known identification code of a known device type,

2. means for comparing said known identification code of said known device type with the unique identification code of a said device which is provided by said means for transferring,

3. storage means for storing instructions useable in controlling the operation of said controller unit, said instructions including groups of instructions useable in servicing the operation of a said device by means of said controller unit,

4. register means having a plurality of registers, one of said registers associated with a different one of each of said devices, each of said registers having contents therein for use in addressing said storage means,

5. means, responsive to the contents of one of said registers, for addressing one of said groups of instructions in said storage means, and

6. means, responsive to a comparison generated by said means for comparing, for loading the contents of an associated one of said registers with the address of a one of said groups of instructions useable in servicing the device identified by said comparison; and

F. means, included in said controller unit and responsive to a service request from one of said devices, for enabling said means for addressing to address said storage means with the address in one of said registers in said register means which is associated with a said device which was identified by said means for comparing, whereby such service requests from said devices enable a device specific group of instructions to be addressed without any further need for identifying the type of said device.

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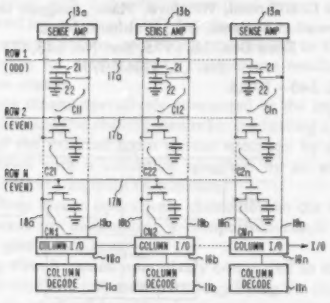
**4,025,907**

## INTERLACED MEMORY MATRIX ARRAY HAVING SINGLE TRANSISTOR CELLS

**Joel Allen Karp, Palo Alto, and John Anthony Reed, Los Altos, both of Calif., assignors to Burroughs Corporation, Detroit, Mich.**

**Filed July 10, 1975, Ser. No. 594,669**
**Int. Cl.² G11C *13/00***
**U.S. Cl. 340—173 CA** **6 Claims**




1. A memory array comprising:

a plurality of single transistor dynamic memory cells;

a plurality of pairs of column conductors, each pair including an odd column conductor and an even column conductor;

a plurality of differential sense amplifiers each coupled between an odd column conductor and an even column conductor of one of said plurality of pairs of column conductors; and

a plurality of row conductors;

said array of transistor cells being arranged in rows and columns such that each cell in an odd row is coupled to a corresponding row conductor and to the odd column conductor of the corresponding pair of column conductors and each cell of an even row is coupled to the corresponding row conductor and to the even column conductor of the corresponding pair of column conductors;

each of said differential amplifiers providing to its respective pair of column conductors an inherent differential balance such that signals of very small amplitude can be detected from one or the other of said pair of column conductors according to whether an odd or even row cell is being accessed.

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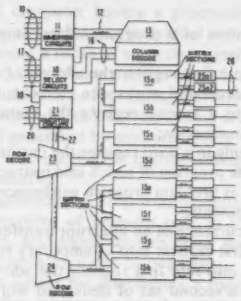
**4,025,908**

## DYNAMIC ARRAY WITH CLAMPED BOOTSTRAP STATIC INPUT/OUTPUT CIRCUITRY

**Ronald Lyle DeRemer, Rochester, and Dale Arthur Heuer, Stewartville, both of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed June 24, 1975, Ser. No. 589,801**
**Int. Cl.² G11C *11/44***
**U.S. Cl. 340—173 CA** **8 Claims**




1. A solid state read only memory unit comprising;

a plurality of bit locations arranged as a matrix of rows and columns of field effect transistor (FET) devices wherein a first logic level is indicated when a gate connection is present and a second logic level is indicated when a gate connection is absent and wherein each FET device includes first and second electrodes connected to the source and drain thereof and a gate which may enable transistor action when a gate connection is present;

first addressing means for addressing a selected column of said matrix of FET devices;

second addressing means for addressing a selected row of said matrix of FET devices;

said first addressing means and said second addressing means cooperating to identify a selected matrix bit location at the intersection of said selected column and said selected row;

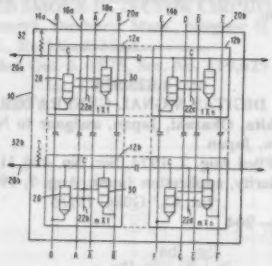
clocked sensing means including a dynamic NAND circuit which senses a plurality of array drain lines during each memory cycle for sensing the logic level at said selected matrix bit location; and

static output latch means which is conditioned by said clocked sensing means and retains the logic level sensed at said selected matrix bit location until reset during a subsequent memory cycle.

## 4,025,909
## SIMPLIFIED DYNAMIC ASSOCIATIVE CELL

Norman Frederick Brickman, and Joseph Carl Logue, both of Poughkeepsie, N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed Sept. 8, 1975, Ser. No. 611,361
Int. Cl.² G11C *11/44*
U.S. Cl. 340—173 FF 8 Claims

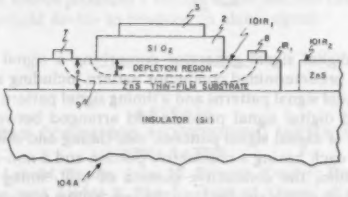


1. In an array for performing logic functions having a storage cell with two, three terminal semiconductive devices; an output line to a first terminal of both the transistors, and coupled through a load device to a source of potential; at least four input lines for carrying the true and complement of at least two input variables; and connection means for coupling a second terminal of each of the semiconductive devices to a different one of the input lines, the improvement in the storage cell comprising a connection coupling the third terminal of at least one of the semiconductive devices to the output line to perform logic functions of one or more of the variables on the input lines.

## 4,025,910
## SOLID-STATE CAMERA EMPLOYING NON-VOLATILE CHARGE STORAGE ELEMENTS

Laurence G. Walker, Palo Alto, Calif., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Division of Ser. No. 543,602, Jan. 23, 1975, Pat. No. 3,987,474. This application May 29, 1975, Ser. No. 582,042
Int. Cl.² G11C *11/42*; H01L *29/78*
U.S. Cl. 340—173 LS 13 Claims

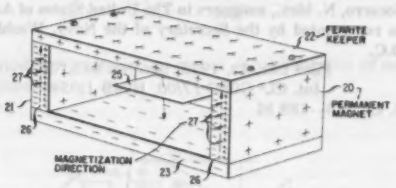



1. A solid-state camera that includes, in combination: a non-volatile, visible-image storage device that comprises a plurality of individual storage elements, each storage element having a stable state and at least one quasi-stable state, said storage device being located at the image plane of the camera; means for applying an electric potential to each storage element, which electric potential operates to change the state of said storage element from the stable state to said at least one quasi-stable state, there being a change in the stored charge of said storage element when the storage element is changed from the stable state to a quasi-stable state, the storage elements being capable of being returned toward the stable state by radiation impinged thereon, which radiation acts to reduce the stored charge, the amount of stored charge remaining after irradiation being related to the intensity and duration of the impinged radiation; optical means operable to direct radiation upon the storage device to create an image thereon, thereby to create an electrical analog in the storage device of the image; and electrical means for sensing the amount of stored charge in each said storage element after the image forming radiation has ceased.

## 4,025,911
## MAGNETIC BUBBLE MEMORY BIAS MAGNET ARRANGEMENT

Andrew Henry Bobeck, Chatham, and Roman Kowalchuk, Bridgewater, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 23, 1975, Ser. No. 625,319
Int. Cl.² G11C *11/02*; H01F *7/02*
U.S. Cl. 340—174 TF 10 Claims

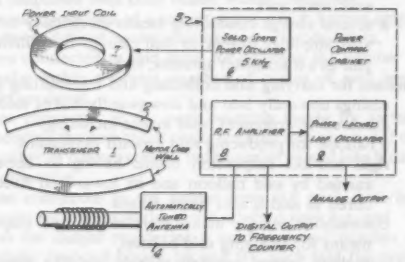



1. A magnetic bubble memory comprising a layer of material in which magnetic bubbles can be moved in the presence of a bias field antiparallel to the magnetization of a bubble in said layer and bias magnet means for providing said bias field, said means including first and second permanent magnets and first and second keepers arranged to form a cavity occupied by said layer and adapted to supply a uniform said bias field throughout said layer, said keepers being offset from one another in a manner to supply a magnetic field component in the plane of said layer.

## 4,025,912
## METHOD AND APPARATUS FOR REMOTELY TRANSDUCING AND TRANSMITTING PRESSURE AND TEMPERATURE CHANGES

John H. Rice, Cumberland, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 19, 1976, Ser. No. 706,656
Int. Cl.² G08C *19/10*
U.S. Cl. 340—189 M 9 Claims




1. A method for sensing and transmitting environmental temperature and pressure conditions comprising:

disposing a signal-receiving and signal generating capacitive transducer in said environment,

radiatively transmitting an electro-magnetic signal to said transducer,

utilizing said transmitted signal power for establishing said transducer capacitance and for driveably generating a remotely-receivable oscillating signal frequency,

varying said established capacitance responsively to said environmental conditions, and

varying said oscillating frequency responsively to said capacitance variations,

whereby said temperature and pressure information is obtainable at a remote location by transmitting said signal to said transducer and receiving its condition-responsive oscillating frequency.

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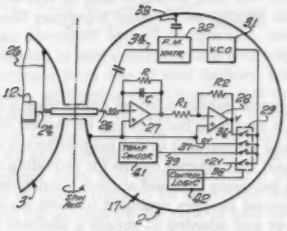
**4,025,913**

## ELECTRICAL FIELD SENSING AND TRANSMITTING APPARATUS

**William Paul Winn, and Leon Geddis Byerley, III, both of Socorro, N. Mex., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Dec. 22, 1975, Ser. No. 642,926**
**Int. Cl.² G08C *17/00*; H04B *1/034***
**U.S. Cl. 340—189 M** **2 Claims**




1. Apparatus for measuring the magnitude of the horizontal component of an electrical field in a thundercloud environment comprising:

electrical field charge collecting and transmitting means including:

a pair of substantially identical spherically shaped hollow electrically-conductive casings disposed in a closely-spaced side-by-side arrangement,

spacer block means for maintaining said side-by-side arrangement, said block means being formed of a dielectric material for structurally insulating said casings one from the other,

a charge amplifier mounted within one of said casings and provided with an input and output,

charge conduction means coupling one of said casings to said input, and

a second charge conducting means electrically coupling said amplifier output to said casings for utilizing the pair as a transmitter antenna; and

means for carrying said collecting and transmitting pair of casings upwardly into and downwardly out of said thundercloud environment, said means including:

a balloon for producing said upward movement,

rigid rod-like suspension means having its upper end carried by said balloon and its lower end fixedly secured to said spacer block means

controllable release means carried by said suspension means for releasing said balloon,

parachute means coupled to said rod-like suspension means below said release means, said means being operable upon balloon release for controlling the downward movement of said casing pair, and

propeller means fixedly secured to said suspension means below said parachute means for rotating said rod-like means and said casing pair during said upward and downward movement,

said pair of casings having a common horizontal axis normally aligned during said upward and downward movement with said horizontal component of the thundercloud field whereby the propeller-induced rotation of said casing pair produces a transmittable sinusoidal amplifier output corresponding in magnitude to said horizontal component of the electrical field, said sinusoidal output being applied to said casing pair for transmission.

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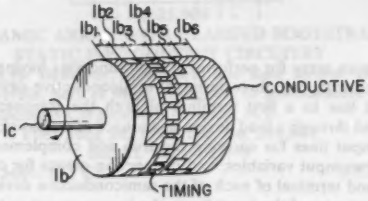
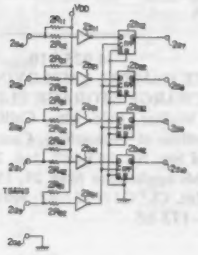
**4,025,914**

## DIGITAL SIGNAL GENERATOR

**Shigeyuki Akita, Okazaki, Japan, assignor to Nippon Soken, Inc., Nishio, Japan**

**Filed Aug. 2, 1974, Ser. No. 494,314**
**Claims priority, application Japan, Aug. 7, 1973, 48-88976**
**Int. Cl.² G08C *19/16***
**U.S. Cl. 340—204** **6 Claims**



1. A digital signal generator comprising a signal section having a predetermined conductor pattern including a plurality of digital signal patterns and a timing signal pattern parallel with said digital signal patterns and arranged between said plurality of digital signal patterns, said timing and said digital patterns each having a conductive portion and a non-conductive portion, the conductive portion of said timing pattern being substantially smaller than the conductive portion of said digital pattern, said conductive portion of said digital pattern having varying widths, the conductive portion of said timing pattern being positioned remote from a line extending transversely across said signal section at the junction of a conductive and non-conductive portion of said digital pattern, a contact group having digital signal contacts slidable over said digital signal pattern to derive a digital signal and a timing signal contact slidable over said timing signal pattern to derive a timing signal, means for shifting the relative position between said signal section and said contact group according to a variable parameter, and a digital signal generator circuit connected to said individual contacts of said contact group for selectively providing said digital signal when said timing signal is derived from said timing signal contact, wherein said digital signal generator circuit comprises a clockable bistable means having data terminals each connected to the associated data

signal contacts respectively, a clock terminal connected to said timing signal contact, and an output terminal for continuing to provide the input signal at each of said data terminals from the instant when the input signal is applied to the clock terminal.

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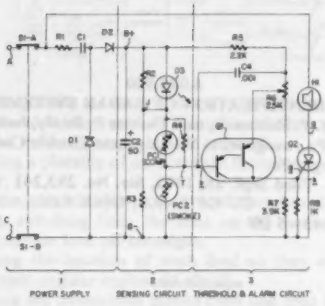
## 4,025,915
## LED SMOKE DETECTOR CIRCUIT

**Robert B. Enemark, Duxbury, Mass., assignor to Electro Signal Lab, Inc., Rockland, Mass.**

**Filed Oct. 6, 1975, Ser. No. 619,629**
**Int. Cl.² G08B** *17/10*
**U.S. Cl. 340—237 S** **6 Claims**




1. Apparatus for detecting fluid borne particles comprising:
a power supply;
a light source;
photoelectric means responsive to source light scattered by particles to produce an alarm output, the light source, and photoelectric means being connected in series across the power supply;
a threshold circuit having an input responsive to the alarm output to produce an alarm signal;
a relatively high resistance in parallel with the light source; and
a relatively low resistance in parallel with the photoelectric means, the resistances having a common junction coupled to the threshold device input such that failure of the light source produces a voltage at the junction causing the threshold device to produce an alarm signal.

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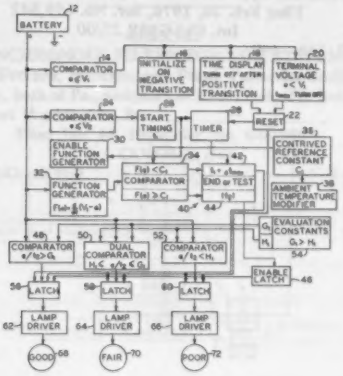
## 4,025,916
## BATTERY CONDITION MONITORING METHOD AND APPARATUS

**John B. Arnold, Seville; John M. Bowyer, Copley; Howard R. Hegbar, and Archie B. Shaefer, both of Akron, all of Ohio, assignors to Goodyear Aerospace Corporation, Akron, Ohio**

**Filed Oct. 14, 1975, Ser. No. 622,202**
**Int. Cl.² G08B** *21/00*
**U.S. Cl. 340—249** **12 Claims**

1. A device for monitoring the condition of a dry cell battery, comprising:
an external load in sensitive engagement with the battery;
a function generator connected to the battery and creating an output voltage as a function of battery terminal voltage;
timing means connected to the battery and the function generator for starting a timing period after application of said external load to the battery when the battery terminal voltage drops at a first level and terminating such period when the output voltage reaches a second level;
comparator means interconnected between the battery and the timing means for comparing the battery terminal voltage against preselected levels at the end of the test




period and producing an output signal indicative of such comparison.

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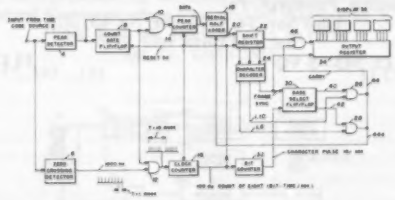
## 4,025,917
## SIMPLIFIED TIME CODE READER WITH DIGITAL PDM DECODER

**James M. DuBrul, Bowie, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Nov. 6, 1975, Ser. No. 629,732**
**Int. Cl.² H03K** *13/00*
**U.S. Cl. 340—347 DD** **16 Claims**



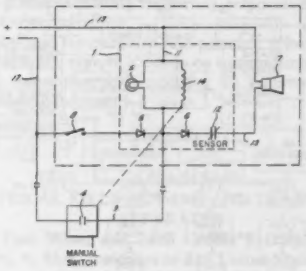
1. A simplified time code reader which comprises:
an input comprised of a carrier signal which carries amplitude-modulated peaks which represent coded data,
means connected to said input for counting the number of peaks within a preset number of cycles of said input carrier signal,
means connected to the peak counting means for serially decoding the number of peaks counted into binary 1 if the number of peaks exceed a limit number *m* and into binary 0 otherwise,
means connected to the output from the peak decoding means for compensating for a selected time lag, and
means for output registering a predetermined number of serially decoded binary 1's and 0's, such that the registered 1's and 0's represent the time in decoded and lag-compensated form,
wherein said time code reader decodes the coded time data independent of the input carrier frequency over a multikilohertz range.

## 4,025,918

### ALARM SYSTEM AND REMOTE MONITOR PANEL

Lee R. Beauchamp, 11715 Innsbury, Houston, Tex. 77016

Filed Feb. 20, 1976, Ser. No. 659,842
Int. Cl.² G08B 25/00
U.S. Cl. 340—409 5 Claims



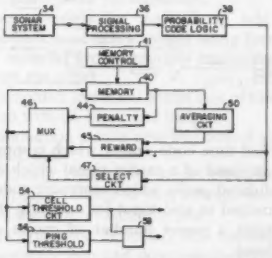

1. An alarm system having a panel board, control units in said panel board, each unit having a sensor activated audio alarm, illuminating means and a sensor mounted in an electrical circuit, a line connected into said circuit and having its terminals mountable in said panel board, each control unit having a transparent plate, and having said illuminating means behind said plate, a switch in said unit having means for manually deactivating said alarm, a shaft extending from said plate to said switch and movable by pressure against said plate to actuate said switch, and circuit directional control means between said switch and said sensor, another line having its terminals in said unit, and having a remote switch closed upon activation of said alarm and illuminating said illuminating means and manually reopened to reset the unit, and deactivate said illuminating means.

## 4,025,919

### AUTOMATIC TARGET DETECTOR

Larry D. Jefferies, Annapolis, and George A. Gilmour, Severna Park, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 14, 1975, Ser. No. 631,973
Int. Cl.² G01S 9/02, 9/66
U.S. Cl. 343—5 VQ 13 Claims




1. Automatic target detection apparatus comprising:

a. means providing a plurality of repetitive line scanned signals indicative of a target area of interest;

b. each said signal having an amplitude as a function of range, with said range being divided into a predetermined plurality of successive range cells so that there is a particular value of signal amplitude corresponding to a particular range cell;

c. storage means having a plurality of storage locations corresponding to said range cells;

d. means for examining said signals in successive time periods, each corresponding to a range cell, for determining the presence of a plurality of predetermined parameters in said signal and providing for each said time period corresponding to a range cell, a weighted output signal dependent upon the number and combination of said parameters present;

e. means for storing values, as a function of said weighted output signal, in corresponding range cell storage locations in said storage means; and

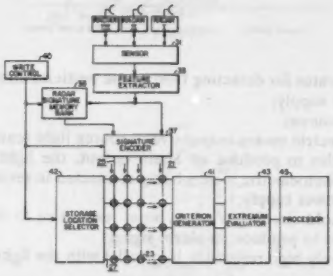
f. means for relatively increasing or decreasing a stored value from one said examination depending upon said weighted output signal from a subsequent examination.

## 4,025,920

### IDENTIFICATION OF RADAR SYSTEMS

Herlbert J. P. Reitboeck, and Thomas P. Brody, both of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 28, 1972, Ser. No. 293,241
Int. Cl.² G01S 1/02; G06K 9/00
U.S. Cl. 343—5 DP 11 Claims

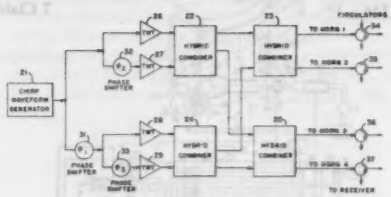



1. Apparatus for identifying one or more of a plurality of radar systems operating in a given region from selected parameters of each of said radar systems, the said apparatus including sensing means for deriving said parameters, said parameters for the different systems being derived at short intervals, typically less than a microsecond, the said apparatus also including at least one matrix having columns and rows of adaptive means, said adaptive means being capable of being set by adaptation in a setting responsive to predetermined adaptation, each of said adaptive means in each row being assigned to one of said selected parameters, adaptation means connected to said rows, for encoding the adaptive means in said rows with different sets of adaptations corresponding to parameters of said systems, each adaptive means in each row being encoded corresponding to its assigned parameter, means for impressing on each of said columns, in comparing relationship with the encoded parameter of the adaptive means of each of said respective columns, an adaptation corresponding to a parameter derived by said sensing means, which parameter corresponds to the assigned parameter of the adaptive means in each of said respective columns, said parameters being impressed substantially simultaneously in each of said columns and said adaptive means substantially in real time producing a response dependent on the deviation of the adaptation impressed thereon from the predetermined adaptation encoded thereon, and means connected to said rows for indicating the row in which the measure of the deviation of the impressed adaptation from the encoded adaptation is a minimum.

## 4,025,921
## TECHNIQUE FOR OBTAINING WIDE BANDWIDTH WITH OPTICALLY FED ARRAY

Eli Brookner, Lexington, and Wilfred F. Leach, Chelmsford, both of Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 19, 1975, Ser. No. 633,354
Int. Cl.² G01S 9/02
U.S. Cl. 343—5 R 1 Claim

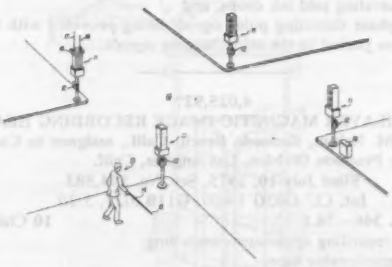


1. In an optically fed array antenna system having a receiver processor and at least one feed located on the boresight of the system the method comprising the steps of:
providing a plurality of off boresight feeds located off boresight;
when the antenna system is directed far enough off boresight, switching from the feed on the boresight to an appropriate feed off boresight;
arranging the location of each feed so they each cover different angular regions of space;
switching the transmitted power from one feed to another depending upon which region of space is selected to be covered;
selectively providing transmitted power to different feeds simultaneously; and
providing frequency weighting depending upon the region of space selected to be covered.

## 4,025,922
## TRAFFIC CONTROL SYSTEM

James C. Trawick, III, Melbourne, Fla., assignor to Stanley G. Grote, La Mesa, Calif.

Filed July 7, 1975, Ser. No. 593,377
Int. Cl.² G01S 9/56; G08G 1/07, 1/095
U.S. Cl. 343—6.5 LC 15 Claims

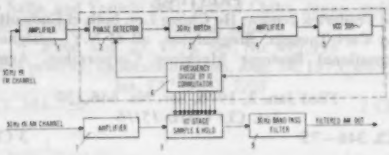


13. A portable interrogating unit comprising manually operable means for producing selectively a signal indicative of desired traffic intersection crossing direction, transmitting means coupled to said manually operable means and responsive to the signal indicative of desired crossing direction for transmitting a safe-to-cross directional request signal to a responding unit, and means which receive and respond to safe-to-cross particular directional signals from a responding unit responsive to the request signal for producing a safe-to-cross signal sensible to persons who may operate the portable interrogating unit.

## 4,025,923
## SYNCHRONOUS FILTER FOR VOR SYSTEMS

John M. Ferrara, Hardley, and Frank Patterson Smith, 2nd, Dresher, both of Pa., assignors to Narco Scientific Industries, Inc., Fort Washington, Pa.

Filed Jan. 14, 1976, Ser. No. 648,900
Int. Cl.² G01S 1/46
U.S. Cl. 343—106 R 5 Claims

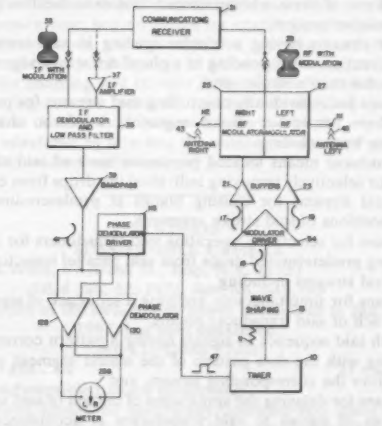


1. A filter circuit for use with a VOR receiver which provides a narrow bandpass in the 30 Hz AM channel to reject interfering signals comprising;
an FM channel to amplify and phase detect an input 30 Hz FM signal;
an AM channel to amplify and filter an input 30 Hz AM signal wherein the filter is a synchronous switched filter;
a phase lock loop in the FM channel to maintain the frequency of the FM channel locked to the frequency of the FM input signal and to provide the switching input signal to the synchronous switched filter;
filter means after the synchronous switched filter to recover the 30 Hz AM fundamental frequency.

## 4,025,924
## MOBILE DIRECTION COMPARATOR

Arthur Luedtke, Marietta, and William Ferrel Bentley Jr., Smyrna, both of Ga., assignors to The United States of America as represented by the Field Operations Bureau of the Federal Communications Commission, Washington, D.C.

Filed Sept. 10, 1975, Ser. No. 611,954
Int. Cl.² G01S 5/04
U.S. Cl. 343—121 11 Claims



1. A mobile comparator used in a direction finding system comprising; timing means, wave shaping means driven by said timing means, modulator driver means having two signal outputs driven by said wave shaping means, modulation means to

modulate two received cardioid antenna signal patterns from left and right antennas, means to combine said signals patterns, means to feed said combined signal into a receiving system, means to demodulate an intermediate frequency signal from said receiving system means for phase detecting the said demodulated intermediate frequency with respect to the original modulation, and directional indication means driven by the said phase detector.

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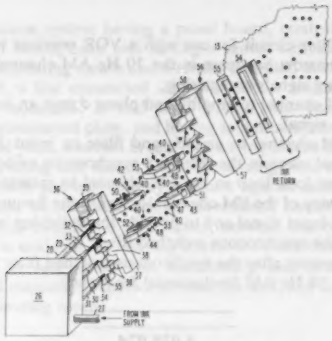
**4,025,925**

## MULTI-NOZZLE INK JET PRINTER AND METHOD OF PRINTING

**Donald Frederick Jensen; Ho Chong Lee, both of Endicott, and John Carl Tamulis, Binghamton, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jan. 2, 1976, Ser. No. 646,130**
**Int. Cl.² G01D *15/16***
**U.S. Cl. 346—75** **3 Claims**



1. Apparatus for printing a line of dot matrix characters comprising,

means for projecting plural streams of individual field controllable ink drops on parallel trajectories toward a print medium while effecting relative motion of said projecting means and said print medium,

said streams being aligned in a single row extending in a direction transverse to said relative motion,

said row of streams being slanted relative to the direction of relative motion,

said streams having a relative spacing in said transverse direction corresponding to a plural dot stroke segment of a dot matrix stroke, and

means for individually controlling said streams for printing their respective stroke segments to form character strokes including

transducer means located proximate each of said streams for selectively removing individual ink drops from each of said streams for causing blanks at predetermined dot positions of said stroke segments,

means for selectively operating said transducers for diverting predetermined drops from said parallel trajectories of said streams including

means for simultaneously applying a sequence of signals to each of said transducer means,

each said sequence of signals having a pattern corresponding with the dots pattern of the matrix segment printed from the corresponding stream, and

means for delaying the application of certain of said sequences of signals to said transducers in accordance with relative spacing of said streams in said direction of relative motion, and

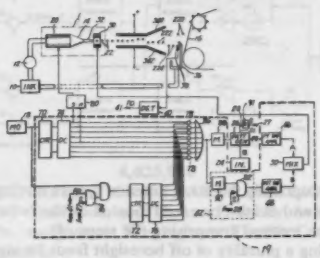
means for deflecting unremoved ink drops in said streams to predetermined dot positions across the length of said stroke segments.

**4,025,926**

## PHASE SYNCHRONIZATION FOR INK JET SYSTEM PRINTER

**Isao Fujimoto, Kunitachi; Takeshi Kasubuchi, and Masahiko Aiba, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Continuation-in-part of Ser. No. 434,218, Jan. 17, 1974, abandoned. This application Mar. 28, 1975, Ser. No. 562,881**
**Claims priority, application Japan, Apr. 25, 1974, 49-7493**
**Int. Cl.² G01D *18/00***
**U.S. Cl. 346—1** **7 Claims**



1. In an ink jet system printer of the charge amplitude controlling type wherein a stream of ink drops are generated by exciting signals of a predetermined frequency propelled towards a printing medium at said predetermined frequency and various charge amplitudes are applied to selected ones of said ink drops by a charging electrode to effect the printing of characters on said printing medium, the method of applying said charge amplitudes in optimum phase synchronization with said ink drops comprising the steps of:

selectively applying printing charging signals of a first polarity to said ink drops;

applying phase detecting charging pulse signals of a predetermined maximum charge amplitude to selected alternate ones of said ink drops of a polarity opposite to said printing signals and sequentially varying the phase of said pulse signals;

sensing the occurrence of said predetermined maximum charge amplitude on said selected alternate ones of said ink drops as an indication of phase synchronization; and

sequentially varying the phase of said printing charging signals to subsequent ink drops in the absence of the occurrence of said indication of phase synchronization;

said printing charging signals being provided with a period which is an integral multiple of that of the exciting signals generating said ink drops; and

said phase detecting pulse signals being provided with the same period as the said charging signals.

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**4,025,927**

## MULTILAYER MAGNETIC IMAGE RECORDING HEAD

**Alfred M. Nelson, Redondo Beach, Calif., assignor to Cubic Photo Products Division, Los Angeles, Calif.**

**Filed July 10, 1975, Ser. No. 594,583**
**Int. Cl.² G03G *19/00*; G11B *5/22*, *5/20***
**U.S. Cl. 346—74.1** **10 Claims**

1. A recording apparatus comprising:

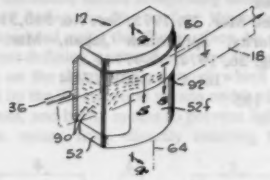
a magnetizeable tape;

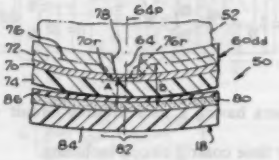
means for moving said tape along a predetermined path; and

a recording head assembly positioned along said path, for forming magnetic images on said tape;

said recording head assembly including a plurality of recording elements having electrically conductive portions in the form of narrow strips that extend parallel to one another in a direction substantially parallel to the length of the tape path portion thereat and that lie close to said tape path, each strip forming a current path extending

largely along its length with the center of the current path lying more than a predetermined distance from said tape path except at a predetermined short length portion of said strip where the center of said current path lies closer than said predetermined distance from said tape path; and




means for applying current pulses selectively to said narrow strips with each current pulse having an amplitude large enough to magnetize a nearby portion of said tape as said current moves through the corresponding short length portion of a strip, but small enough so the current does not magnetize said tape as the current moves through the rest of the narrow strip.

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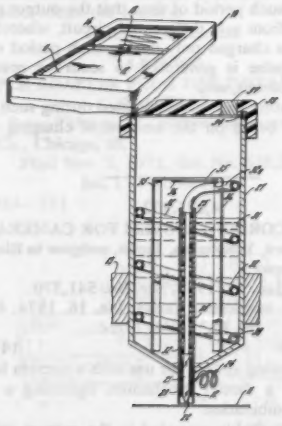
**4,025,928**

## UNITARY INK JET AND RESERVOIR

**Shou L. Hou, Barrington; James D. Beasley, and Donald J. Koneval, both of Arlington Heights, all of Ill., assignors to Gould Inc., Rolling Meadows, Ill.**

**Filed Apr. 19, 1976, Ser. No. 678,062**
**Int. Cl.² G01D *15/18***
**U.S. Cl. 346—140 A** **4 Claims**



1. An ink jet writing device comprising, in combination, a housing defining a cylindrical chamber adapted to be mounted for movement perpendicularly to the axis of said chamber, a tubular shroud fixed substantially on the center line of said chamber and defining an opening from the chamber, an ink jet assembly fixed in said opening and including an orifice defining member and a transducer for expelling droplets of ink from said member through said orifice, a viscoelastic conduit opening to said member, running through said shroud and having a length coiled within said chamber, and means for opening said chamber so as to supply the chamber with ink.

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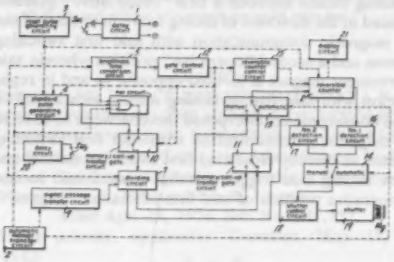
**4,025,929**

## EXPOSURE TIME CONTROL DEVICE OF ELECTRIC SHUTTER FOR CAMERA CAPABLE OF AUTOMATIC AND MANUAL SETTINGS

**Takeo Saito, and Youichi Seki, both of Chiba, Japan, assignors to Seiko Koki Kabushiki Kaisha, Japan**

**Filed Aug. 23, 1974, Ser. No. 499,995**
**Claims priority, application Japan, Aug. 24, 1973, 48-95007**
**Int. Cl.² G03B *7/08***
**U.S. Cl. 354—50** **2 Claims**



1. In a shutter control circuit of the type having a brightness-time conversion circuit for developing an output pulse having a duration representative of an exposure time; a standard pulse generating circuit for generating standard pulses at a certain rate; and a reversible counter operable in an addition mode for counting standard pulses, and operable in a subtraction mode for reading-out the number of counter pulses; the improvement which comprises; first means for enabling said counter in the addition mode and for applying standard pulses to said reversible counter for the duration of the brightness-time conversion circuit output pulse, whereby the number of standard pulses counted is representative of an exposure time; means for enabling said counter in the subtraction mode and reading-out the number of standard pulses counted to control the exposure time; second means for enabling said counter in the addition mode and operable for applying a selectable number of the standard pulses to aid reversible counter; and means for enabling said counter in the subtraction mode and for reading-out the selected number of standard pulses counted to control the exposure time, whereby the exposure time is selectable by selecting the number of standard pulses applied to said reversible counter.

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**4,025,930**

## SUBMERSIBLE CAMERA

**Clifford Wolff, 67 Brook St., Islip, N.Y. 11751**

**Filed Jan. 12, 1976, Ser. No. 648,199**
**The portion of the term of this patent subsequent to Jan. 14, 1992, has been disclaimed.**
**Int. Cl.² G03B *17/08***
**U.S. Cl. 354—64** **21 Claims**

1. A submersible camera comprising:

a camera having an electrically operated film drive and shutter mechanism and an electrically operated zoom lens mechanism;

housing means defining a sealed chamber for receiving and housing said camera therein, said housing means having at least a portion which allows a magnetic field to pass

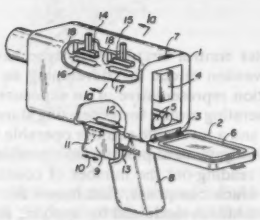
therethrough and having at least a transparent portion in registration with the zoom lens of said camera;

first magnetically operated switching means located within said chamber of said housing means without physically penetrating through said housing means, said first switching means being electrically connected in an electrical operating circuit of said camera for selectively opening and closing an electrical circuit of at least the shutter mechanism of said camera to thereby selectively operate the shutter of said camera;

first magnetic means located outside of said housing means and adapted to be located in selective magnetic communication with said first switching means, without physically penetrating through said housing means, to close said first switching means and operate said shutter of said camera, said first magnetic means comprising:

a trigger member carrying a first permanent magnet adjacent an outer surface of said housing means, said trigger member being selectively operable to slide said first permanent magnet along said outer surface of said housing means between a first "inoperative" position spaced in the direction of sliding movement thereof out of magnetic communication with said first switching means and a second "operative" position wherein said permanent magnet is located opposite to and in registration with said first switching means with a wall of said housing means interposed therebetween so as to be in magnetic communication with said first switching means to thereby close said first switching means; and

means biasing said trigger member toward said second inoperative position of said first permanent magnet;



second magnetically operated switching means including at least first and second magnetically operated switches located within said chamber of said housing means without physically penetrating through said housing means, said second switching means being connected in an electrical operating circuit of said zoom lens mechanism of said camera for selectively opening and closing the electrical operating circuit of said zoom lens mechanism to thereby selectively operate said zoom lens mechanism; and

second magnetic means located outside of said housing means and adapted to be located in selective magnetic communication with said at least first and second magnetically operated switches of said second switching means, without physically penetrating through said housing means, to selectively close at least one of said first and second magnetically operated switches of said second switching means to selectively operate said zoom lens mechanism, said second magnetic means comprising:

at least a second permanent magnet adjacent an outer surface of said housing means and being movable between a first inoperative position spaced from at least one switch of said second switching means and a second operative position wherein said permanent magnet is located opposite to and in registration with said at least one switch of said second switching means so as to be in magnetic communication therewith through said housing means to thereby close said at least one switch; and

means biasing said second permanent magnet towards said inoperative position thereof.

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**4,025,931**

**EXPOSURE DATA PRINTING DEVICE FOR A CAMERA**

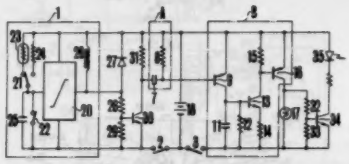
**Tetsuya Taguchi; Mutsunobu Yazaki, and Noriaki Sanada, all of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 20, 1975, Ser. No. 560,318**

**Claims priority, application Japan, Mar. 27, 1974, 49-34206; Aug. 26, 1974, 49-97741**

**Int. Cl.² G03B *17/24***

**U.S. Cl. 354—105** **22 Claims**



22. A camera having a data printing circuit which comprises:

a. a shutter time control circuit including:

1. a power source,
2. a time constant circuit,
3. a first switching circuit to conduct switching in response to the output of said time constant circuit, and,
4. an electromagnetic means to control a shutter closing member by switching of said first switching circuit; and

b. a data printing circuit which includes:

1. a differential circuit,
2. a second switching circuit connected to said first switching circuit and said second switching circuit is operated in response to the switching of said first switching circuit to impress the voltage of said power source onto the differential circuit, whereby said differential circuit produces an output pulse when said second switching circuit is operated,
3. a capacitor,
4. a third switching circuit which is connected between the power source and the capacitor and becomes ON in response to said output pulse from said differential circuit for such period of time that the output pulse is generated from said differential circuit, whereby said capacitor is charged only during such period of time that said pulse is generated to secure a prescribed charging amount, and
5. a data printing light source lighted during such period of time as based on the amount of charging at said capacitor.

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**4,025,932**

**DATA RECORDING SYSTEM FOR CAMERA**

**Fumihiro Miyagawa, Yokohama, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan**

**Filed Jan. 15, 1975, Ser. No. 541,370**

**Claims priority, application Japan, Jan. 16, 1974, 49-7329**

**Int. Cl.² G03B *17/24***

**U.S. Cl. 354—109** **14 Claims**

1. A data recording system for use with a camera having a camera lens and a shutter mechanism operating a shutter comprising, in combination:

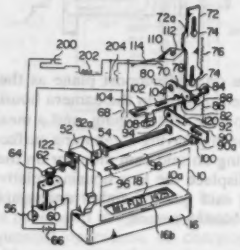
data means detachably mounted in the camera on which data to be recorded is printed;

illumination means to illuminate the data on the data means;

optical means to project an image of the data onto a film

surface, said optical means comprising a lens to focus the data onto the film surface and a reflector to reflect the image of the data so that the image is incident on the film surface at substantially a right angle;

enclosure means operatively arranged within the camera to be moved aong the data to scan the data, the illumination and optical means being mounted within the enclosure means, the enclosure means comprising means defining a first aperture facing the film surface through which the image is projected onto the film surface by the optical means, means defining a second aperture closely adjacent to the data on the data means through which the data is illuminated by the illumination means and is visible to the optical means, and baffle means to prevent light from the illumination means from directly entering the optical means;



drive means actuated by the camera shutter mechanism to energize the illumination means and move the enclosure means when the camera shutter is opened, the drive means comprising a sliding link operatively connected to the camera shutter mechanism , a changeover link to select whether or not to record the data on the film, a shutter operatively connected to the sliding link to cover a portion of the film surface on which the data is recorded when the camera shutter is opened, and an electrical circuit comprising a power source to energize the illumination means and a motor for moving the enclosure means, a first normally open switch which is closed by the changeover link when the date is recorded on the film and a second normally open switch which is closed by the sliding link; and

rail or track means by which the enclosure means is slidably mounted within the camera.

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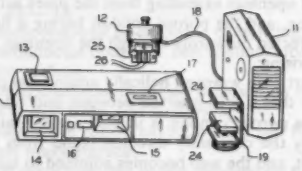
**4,025,933**

## MULTIPLE ADAPTER PLUG FOR INSTAMATIC-TYPE CAMERAS

George R. Berg, Chicago, Ill., assignor to Acme-Lite Manufacturing Co., Chicago, Ill.

Filed Nov. 3, 1975, Ser. No. 628,232
Int. Cl.² G03B *15/05*
U.S. Cl. 354—141 5 Claims



1. In combination with an electronic flash unit, improved means for connecting said flash unit to a camera, said improved connecting means being adapted for use with a camera having sockets adapted to receive either flash cube or flash bars, said flash cube sockets having strikers thereto, said strikers being positionable outward, said flash bar sockets having electrically conductive elements positioned therein, said improved connecting means comprising:

plug means having two male ends;

the first of said two ends being shaped and dimensioned to engagingly cooperate with a flash bar socket on a camera;

said first of said two ends having conductive means therein corresponding to said electrically conductive elements in said flash bar socket;

the second of said two ends being shaped and dimensioned to engagingly cooperate with a flash cube socket on a camera;

said second of said two ends having contact means therein positioned to be engaged by said striker when said striker is outwardly positioned;

means connecting said plug means to said electronic flash unit; and

means to selectively position said flash unit on a camera; said positioning means being adapted to face said flash unit forward when mounted on said camera.

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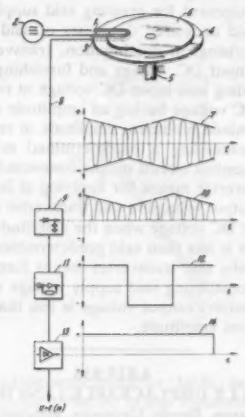
**4,025,934**

## METHOD AND DEVICE FOR DETERMINING A VALUE CORRESPONDING TO THE NUMBER OF REVOLUTIONS OR THE ANGLE OF ROTATION OF AN AXLE

Georg Hartmann, Marloffstein, and Adam Dittner, Hochstadt, both of Germany, assignors to Frieseke & Hopfner GmbH Erlangen-Bruck, Erlangen-Bruck, Germany

Filed Apr. 29, 1976, Ser. No. 681,757
Claims priority, application Germany, May 13, 1975, 2521163
Int. Cl.² G01P *3/46;* G01R *19/18*
U.S. Cl. 324—163 8 Claims



1. A method for determining a revolution-related value, such as the number of revolutions or the rotatonal angle of an axle, said value being in the form of an electrical analog signal, said method comprisng the steps of:

supplying a high frequency signal to a primary coil of a pickoff element having a linearly-shaped primary coil and a linearly-shaped secondary coil, planes of said coils being parallel with an air gap therebetween for the formation of a stray field;

disposing a metallic disc having a rim in the form of an Archimedes'spiral in said air gap, said disc being affixed to said axle which is subject to rotation;

rotating the axle so as to cause an amplitude-modulated signal to be developed on said secondary coil;

demodulating said amplitude-modulated signal; and

differentiating said demodulated signal to develop an elec-

trical analog signal proportional to the angular rotation or the number of revolutions of the axle carrying the metallic disc.

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## 4,025,935
## CAMERA WITH MEANS FOR MAINTAINING A CONSTANT DC SUPPLY VOLTAGE

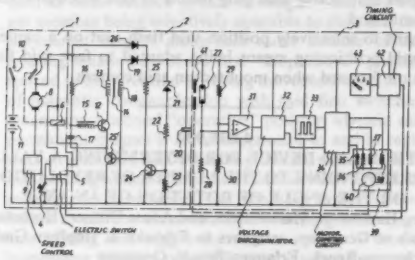
**Eduard Wagensonner, Aschheim, and Volkmar Stenzenberger, Unterhaching, both of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany**

**Filed Mar. 4, 1976, Ser. No. 663,817**

**Claims priority, application Germany, Mar. 5, 1975, 2509497**

**Int. Cl.² G03B *1/00*; G05F *1/62***

**U.S. Cl. 354—173** **11 Claims**



**1.** In a camera having a battery subject to undesired decreases in battery output voltage and having exposure regulating apparatus operative only upon energization by a supply voltage having a supply voltage amplitude between a predetermined minimum amplitude and a predetermined maximum amplitude, equipment for creating said supply voltage independent of said undesired decreases of said battery output voltage, comprising, in combination, transverter means for receiving an input DC voltage and furnishing an output DC voltage exceeding said input DC voltage in response thereto, said output DC voltage having an amplitude at least equal to said predetermined minimum amplitude in response to input DC voltage exceeding a predetermined minimum driving voltage; and control circuit means connected to said battery and said transverter means for applying at least a portion of said battery output voltage to said transverter means to constitute said input DC voltage when the amplitude of said battery output voltage is less than said predetermined minimum amplitude, whereby said transverter means furnishes an output DC voltage constituting said supply voltage when the amplitude of said battery output voltage is less than said predetermined minimum amplitude.

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## 4,025,936
## AXIALLY DISPLACEABLE LENS HOUSING

**Karl Heinz Lange, Bunde, Germany, assignor to Balde-Werke Photographische Gerate & Kunststoff GmbH & Co., Bunde, Germany**

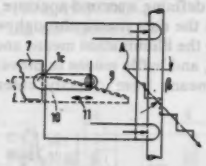
**Filed Nov. 21, 1975, Ser. No. 634,218**

**Claims priority, application Germany, Mar. 14, 1975, 2511159**

**Int. Cl.² G03B *17/00***

**U.S. Cl. 354—286** **13 Claims**

**1.** A mounting assembly for an axially displaceable lens housing on a camera housing comprising a lens housing guide member mounted on the camera housing along which the lens housing is slideably moveable, said lens housing guide member extending substantially normal to a plane through a film operatively mounted in the camera housing, the lens housing including first and second means cooperating with said guide member, the lens housing being axially displaceable relative to the camera housing along said guide member on said first and second means, biasing means connected to the lens housing and the camera housing for biasing the lens housing towards the camera housing, said biasing means statically determining a constant engagement between said guide member and said first and second means provided on the lens housing which cooperate therewith, a support bearing having a bearing surface, said support bearing being mounted on the lens housing, a support plane having a bearing surface, said support plane being provided in the camera housing, said support bearing



being slideable on said support plane as the lens housing is axially displaced relative to the camera housing, a cam member mounted on the lens housing, and a means connected to the camera housing having a camming surface, said camming surface camming on said cam member on the lens housing so as to axially displace the lens housing relative to the camera housing along said guide member and against the bias provided by said biasing means.

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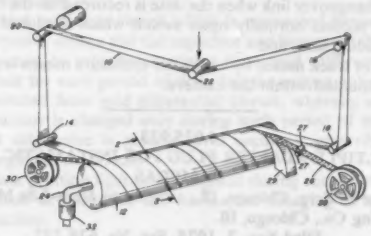
## 4,025,937
## WEB TRANSPORT APPARATUS

**Harold D. Lowry, and Robert F. Allen, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Aug. 15, 1975, Ser. No. 605,352**

**Int. Cl.² G03D *5/00***

**U.S. Cl. 354—318** **4 Claims**



**1.** An apparatus for transporting a web over a porous conduit, which porous conduit has an inner surface and an outer surface and openings extending from the inner surface to the outer surface, and the porous conduit having a liquid under pressure directed outwardly through the openings, said apparatus comprising:

a transport strip wrapped helically around the porous conduit so that a web inserted between said transport strip and the porous conduit is pushed against said transport strip by the outwardly directed liquid from the porous conduit, and the web becomes adjoined to said transport strip under the influence of liquid cohesion produced by liquid sandwiched between the web and said transport strip; and

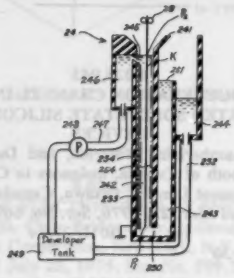
means for advancing said transport strip, thereby causing the adjoined web to be advanced with said transport strip over the porous conduit.

## 4,025,938

## LIQUID DEVELOPER RESERVOIR FOR COPYING MACHINE

Shizuo Miyata, Osaka, and Motokazu Nakao, Sakurai, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed May 16, 1975, Ser. No. 578,175
Claims priority, application Japan, May 17, 1974, 49-55914; May 17, 1974, 49-55915
Int. Cl.² G03D *3/02*; G03G *15/10*
U.S. Cl. 354—324 5 Claims




1. A liquid developer unit for use in a copying machine which forms a developed image on a photosensitive paper by virtue of sequential operations of charging, exposure and developing with movement of the photosensitive paper upward and downward, said liquid developer unit comprising:

a. a liquid developer tank;

b. a liquid developer reservoir including a pouring section; an outflow section;

a superfluous liquid reserving section;

a vertical partition wall provided between the pouring section and the outflow section; and an aperture formed at the bottom of the partition wall for communicating the pouring section and the outflow section with each other;

c. means for conducting the photosensitive paper into the pouring section;

d. developing liquid supplying means for supplying developing liquid from the liquid developer tank to the pouring section to maintain the liquid level in the pouring section higher than that in the outflow section; and

e. circulation means for conducting superfluous developing liquid from the superfluous liquid reserving section to the liquid developer tank.

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## 4,025,939

## SEMICONDUCTOR LASER DEVICE AND A METHOD FOR FABRICATING THE SAME

Kunio Aiki, Hachioji; Michiharu Nakamura, Nishitama, and Jun-Ichi Umeda, Hachioji, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 20, 1975, Ser. No. 606,053
Claims priority, application Japan, June 11, 1975, 50-69544
Int. Cl.² H01L *33/00*; H01S *33/19*; H01L *29/161*
U.S. Cl. 357—18 47 Claims

1. A semiconductor laser device comprising:

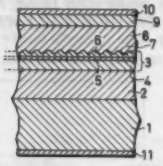
a semiconductor body of a first conductivity type having a major surface;

an optical confinement region disposed on said major surface of said body, and comprising

a laser active region having a band gap $E_1$, disposed on said major surface;

a first semiconductor region disposed on said laser active region, having a band gap wider than the band gap $E_1$ of the laser active region, and having a second conductivity type opposite said first conductivity type; and

a second semiconductor region of said second conductivity type disposed on said first semiconductor region, having a band gap $E_2$, wherein $E_2 \geq E_1$, the surface of the second semiconductor region opposite that disposed on said first semiconductor region being periodically corrugated; and



a semiconductor layer having said second conductivity type and having a refractive index lower than the mean value of the refractive indices of said laser active region, the first semiconductor region and the second semiconductor region, disposed on the corrugated surface of the second semiconductor region.

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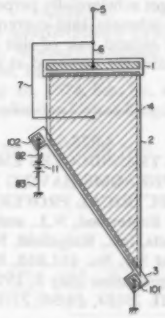
## 4,025,940

## MOS TYPE SEMICONDUCTOR DEVICE

Takeji Kimura; Michihiro Inoue, both of Hirakata; Masaharu Sato, Moriguchi, and Shiro Horiuchi, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 14, 1975, Ser. No. 621,839
Claims priority, application Japan, Oct. 18, 1974, 49-120856; Aug. 19, 1975, 50-100846; Sept. 2, 1975, 50-106750
Int. Cl.² H01L *29/78*
U.S. Cl. 357—23 14 Claims



1. A metal-oxide-semiconductor (MOS) device comprising:

a semiconductor substrate of one conductivity type;

a source and a drain region of an opposite conductivity type selectively formed in said semiconductor substrate;

a gate electrode disposed between said source and drain regions;

a channel portion formed in the semiconductor substrate beneath said gate electrode;

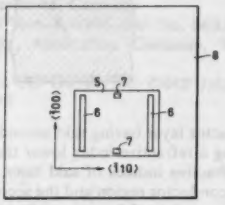
a plurality of source electrodes formed on said source region, said source electrodes being spaced from each other in a direction across the width of said channel portions; and

a variable potential source for applying a variable control voltage to at least one of said source electrodes, the resistance of the source region between said plurality of source electrodes establishing a potential distribution and said control voltage applied to the source electrode controlling a channel current through the channel portion between said source and drain regions.

## 4,025,941
## HALL ELEMENT

Yozo Kanda; Michiyoshi Maki; Masatoshi Migitaka, and Kikuji Sato, all of Kokubunji, Japan, assignors to Hitachi, Ltd., Japan

Filed Apr. 8, 1975, Ser. No. 566,092
Claims priority, application Japan, Apr. 26, 1974, 49-46478
Int. Cl.² H01L 27/22, 43/06, 29/04
U.S. Cl. 357—27 11 Claims




1. A Hall element for reducing unbalanced voltages comprising

a thin element of n-type Si having two parallel major surfaces, each of said major surfaces being substantially parallel to the {110} crystalline atomic plane,

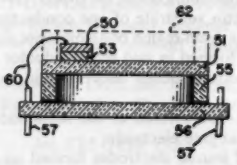
a pair of current electrodes for applying current across said thin Si element, said pair of current electrodes being separated across at least one of said major surfaces in a first direction within ±15° of one of the <100> and <110> crystalline directions, and

a pair of Hall voltage electrodes for providing a Hall voltage output, said pair of voltage electrodes being separated across said major surface in a second direction substantially normal to said first direction, wherein said thin Si element is rectangular and has a first pair of side edges substantially parallel to said first direction and a second pair of side edges substantially perpendicular to said first direction, and wherein said current electrodes are arranged at said second pair of side edges and said Hall voltage electrodes are arranged at said first pair of side edges.

## 4,025,942
## LOW PRESSURE TRANSDUCERS EMPLOYING LARGE SILICON DIAPHRAGMS HAVING NON-CRITICAL ELECTRICAL PROPERTIES

Anthony D. Kurtz, Englewood, N.J., assignor to Kulite Semiconductor Products, Inc., Ridgefield, N.J.

Continuation of Ser. No. 451,860, March 18, 1974, abandoned. This application May 5, 1976, Ser. No. 683,498
Int. Cl.² H01L 29/84, 29/96, 23/30; B01B 7/16
U.S. Cl. 357—26 8 Claims




1. A pressure transducer for pressure measurements of about 15 psi or less, comprising:

a. a wafer of n-type silicon having a top surface and a relatively smooth bottom surface,

b. a piezoresistor diffused into said top surface of said n-type silicon wafer,

c. a silicon diaphragm fabricated from a separate and distinct piece of silicon of non-critical electrical properties as compared to said wafer, said diaphragm being much larger than said wafer,

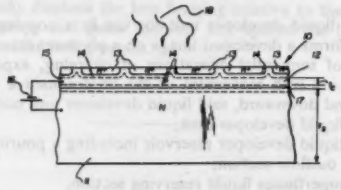
d. means bonding said wafer at said bottom surface at a position on said diaphragm removed from said center, said means including a glass bond, and

e. housing means coupled to said diaphragm about the outer periphery thereof to position the same in a pressure sensing mode.

## 4,025,943
## PHOTOGENERATION CHANNEL IN FRONT ILLUMINATED SOLID STATE SILICON IMAGING DEVICES

Savvas G. Chamberlain, Waterloo, and David H. Harper, Kitchener, both of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Mar. 22, 1976, Ser. No. 669,406
Int. Cl.² H01L 27/14
U.S. Cl. 357—30 6 Claims



1. A photoelement array for imaging devices comprising:

substrate means having a layer of doped semiconductor material of a first type, said substrate having a thickness $t_s$ to provide structural strength;

a photogeneration channel of doped semiconductor material of a second type located on said substrate layer for producing charged carriers in response to incident optical energy penetrating said channel;

photoelement means providing an arrangement of discrete potential minima within said photogeneration channel for collecting the charged carriers produced therein, the centers of adjacent potential minima being spaced at a distance $d$; and

bias means for reverse biasing said photogeneration channel with respect to said substrate layer to produce a carrier depletion region along the adjacent channel and substrate means surfaces for draining out carriers produced by optical energy penetrating deep in the channel, wherein the effective thickness $t_e$ of the channel between the potential minima depletion region and the reverse bias depletion region is in the order of $d/\pi$.

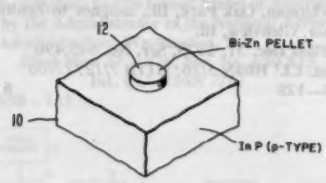
## 4,025,944
## OHMIC CONTACTS TO p-TYPE INDIUM PHOSPHIDE

Ronald L. Moon, Menlo Park, Calif., assignor to Varian Associates, Palo Alto, Calif.

Filed Apr. 5, 1976, Ser. No. 673,781
Int. Cl.² H01L 29/161, 23/48, 29/46, 7/46
U.S. Cl. 357—67 15 Claims

1. A body of p-type indium phosphide having an ohmic contact to a surface therof, said ohmic contact comprising a body of bismuth alloyed with a small percentage of an element

selected from the class consisting of zinc, magnesium, cadmium and beryllium in an amount effective to permit alloying




of said body to said contact to form a substantially ohmic connection.

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**4,025,945**

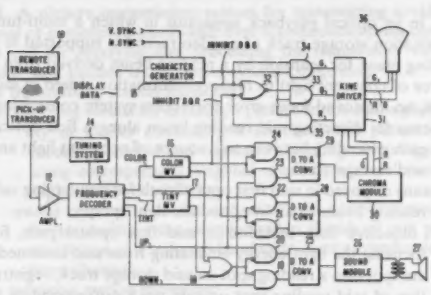
## COLOR FUNCTION DISPLAY SYSTEM

**Thomas Austin St. Clair Bridgewater, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.**

**Filed July 25, 1975, Ser. No. 599,257**

**Int. Cl.² H04N 9/02**

**U.S. Cl. 358—1** **4 Claims**




1. A color function display system, comprising:

means for generating coded signals representative of data and representative of a color indicating a particular function enabled mode to be displayed on a color display tube;

character generator means coupled to said means for generating coded signals and responsive to said coded signals for generating video signals representative of said data;

enabling means coupled to said means for generating coded signals and responsive to said coded signals for generating a color enabling signal; and

color video signal generating means coupled to said character generator means and said enabling means and responsive to said video signals representative of said data and responsive to said color enabling signal for producing color representative signals for displaying said data in said color representative of said function enabled mode.

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**4,025,946**

## METHOD AND APPARATUS FOR GENERATING GRAPHIC DESIGNS

**Susan D. Casey, 243 W. 72nd St. No. 7, New York, N.Y. 10023**

**Filed Mar. 22, 1976, Ser. No. 669,261**

**Int. Cl.² H04N 9/02**

**U.S. Cl. 358—81** **15 Claims**

14. A system for generating a graphic design comprising:

a source of light;

means for scanning said light source to generate a video signal;

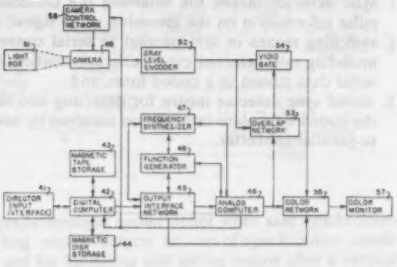
means for generating a plurality of signals representing parameters of a raster signal;

means responsive to said parameter signals for generating a raster signal;

means responsive to said video signal and said raster signal for generating a modified video signal;

display means responsive to said modified video signal for generating a static visual display; and

means for recording said visual display as said graphic design.




15. A system according to claim 14 wherein said scanning means is a television camera, said parameter signals generating means is a circuit for generating analog signals representing parameters of a raster signal, said raster signal generating means is an analog computer responsive to said analog signals, said modified video signal generating means is a color encoder, said display means is a cathode ray tube and said recording means is a still camera.

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**4,025,947**

## VIDEO ASSIGNMENT SYSTEMS

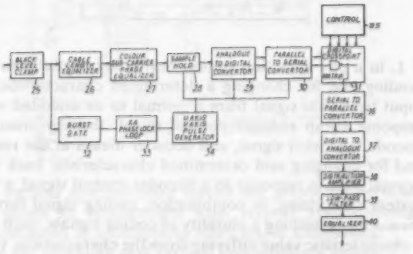
**Peter Colin Michael, Newbury, England, assignor to Micro Consultants Limited, England**

**Filed May 28, 1974, Ser. No. 473,354**

**Claims priority, application United Kingdom, May 30, 1973, 25720/73**

**Int. Cl.² H04B 1/06**

**U.S. Cl. 358—86** **10 Claims**




1. A video and audio signal assignment system for handling incoming signals having horizontal synchronizing pulse and colour burst information thereon said system comprising:

a. a plurality of analog-to-digital converters for receiving and converting said incoming signals into digital form,

b. a plurality of parallel-to-serial converters having their inputs connected to the outputs of the analog-to-digital converters for converting said signals into serial data,

c. a digital cross-point switching matrix connected to the outputs of said parallel-to-serial converters;

d. a plurality of serial-to-parallel converters connected to said cross-point matrix for receiving said serial data;

e. a plurality of digital-to-analog converters connected to said serial-to-parallel converters;
f. a control device for enabling the connection between selected inputs and outputs of said matrix,
g. burst detector means for detecting the colour burst information on said incoming video signals,
h. clocking generator means determining the rate of conversion of said video signal into digital form, said clocking generator conversion rate being controlled by said detected colour burst signal,
i. sync detector means for detecting the horizontal sync pulse information on the incoming video signal,
j. switching means in said parallel to serial converter for including said detected cync pulse information into said serial data stream in a coded form, and
k. coded sync detector means for detecting and retrieving the coded sync pulse information received by said serial-to-parallel converter.

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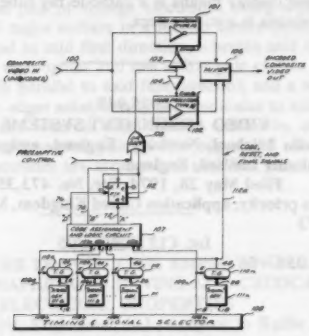
**4,025,948**

## CODING SYSTEM FOR PAY TELEVISION APPARATUS

**Albert M. Loshin, Melville, N.Y., assignor to Teleglobe Pay-TV System, Inc., Rego Park, N.Y.**

**Filed Feb. 25, 1975, Ser. No. 552,787**
**Int. Cl.² H04N** *1/44*
**U.S. Cl. 358—122** **24 Claims**



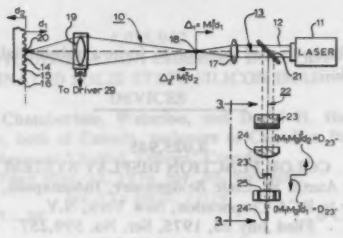

1. In a pay television system having encoder means at the sending end for changing a determined characteristic of an input television signal from a normal to an encoded state in response to an encoder control signal, thereby creating an encode television signal, and decoder means at the receiving end for changing said determined characteristic back to said normal state in response to a decoder control signal, a coding system comprising, in combination, coding signal furnishing means for furnishing a plurality of coding signals, each having a characteristic value differing from the characteristic value of the others of said coding signals, each in response to a corresponding enabling signal; enabling means connected to said coding signal furnishing means for furnishing said enabling signals to said coding signal furnishing means during predetermined time intervals of said input television signal; programmable logic circuit means including selectively operable means for setting up a program code assignment, connected to said enabling means and said encoder means for furnishing said encoder control signal only in response to enabling signals selected in accordance with said program code assignment; and mixer means connected to said coding signal furnishing means for inserting said coding signals into said encoded television signal, prior to transmitting said encoded television signal to said decoder means.

**4,025,949**

## SYMMETRICAL ASTIGMATIC FOCUS SENSING SYSTEM

**Robert L. Whitman, Oak Park, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.**

**Filed Dec. 31, 1975, Ser. No. 645,490**
**Int. Cl.² H04N** *5/76;* **G11B** *7/12, 17/00*
**U.S. Cl. 358—128** **6 Claims**

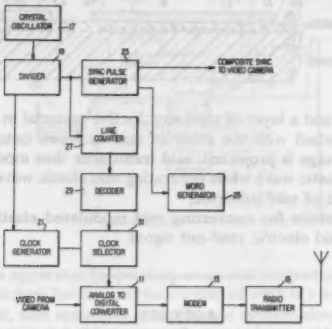



1. In an optical playback apparatus in which a multi-turn information storage track of a video record is supported in a reading plane for scansion by a reading beam derived from a source of coherent light to retrieve information stored in said track, an improved focus error correction system comprising:
means for directing said reading beam along a first optical path extending between said source of coherent light and said storage track;
means disposed in said first optical path for converging said reading beam to an intermediate light spot;
an objective lens, included in said first optical path, for focusing the light energy emanating from said intermediate spot into a reading spot on said storage track, registration of said reading spot on said track corresponding to optimum focusing condition when said track is positioned in said reading plane;
a beam-splitter, also included in said first optical path, for establishing a second optical path for light reflected from said track and for relaying a reflected image of said reading spot into said second path;
a pair of spaced apart orthogonally disposed cylinder lenses of substantially identical focal lengths positioned along said second path and comprising, in conjunction with said light converging means, first and second telescopes for forming respective first and second astigmatic images of said reading spot along said second path, said images being spaced apart a distance substantially equal to the separation of said cylinder lenses, and,
the spatial positions of said astigmatic images being effectively displaceable along said second path distances proportional to a misregistration between said track and said reading plane;
photoreceptor means effectively interposed in said second path approximately midway between said first and second astigmatic images and responsive to relative variations in the light energy of said astigmatic images, attributable to displacement of said images due to a misregistration between said storage track and said reading plane, for developing an error signal indicative of the sense and extent of such a departure from said optimum focusing condition; and
means, responsive to said error signal, for effecting a relative displacement between said objective lens and said track to re-establish said optimum focusing condition.

## 4,025,950
## SAMPLING VIDEO COMPRESSION SYSTEM

**Yutaka Matsumoto, San Jose, and Henry Lum, Palo Alto, both of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed May 27, 1976, Ser. No. 690,815**
**Int. Cl.² H04N 7/12**
**U.S. Cl. 358—133** **9 Claims**




1. A picture transmission system for transmitting a video signal of compresed bandwidth over a communications channel and for receiving and processing the transmitted video signal, said picture transmission system comprising:

a transmitting station including:

sampling means for dividing a picture frame into a plurality of blocks containing a checkerboard pattern of picture elements and regularly sampling video signals along corresponsing diagonal rows of picture elements in the respective blocks;

means responsive to the output of said sampling means for transmitting the sampled video signals of one picture frame at a reduced bandwidth over a communications channel;

a receiving station including:

a frame memory for temporarily storing transmitted video signals of one picture frame; and

play-back means responsive to the output of said frame memory for playing back the video signals of one picture frame at the original high bandwidth frequency.

## 4,025,951
## VERTICAL SYNCHRONIZING CIRCUIT HAVING ADJUSTABLE SYNC PULSE WINDOW

**Robert R. Eckenbrecht, East Bethany, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.**

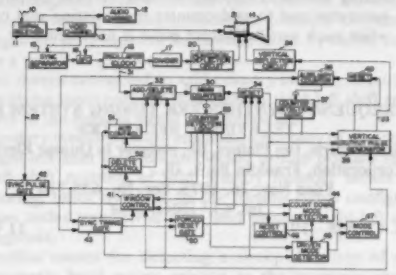
**Filed June 9, 1976, Ser. No. 694,238**
**Int. Cl.² H04N 5/05**
**U.S. Cl. 358—158** **10 Claims**

1. A vertical synchronizing circuit for providing vertical output pulses in synchronism with vertical synchronizing pulses contained in a composite video signal, said circuit including means for providing pulses synchronized with horizontal synchronizing pulses contained in said composite video signal, counting means connected to said means for providing pulses for counting the pulses provided thereto, and output means connected to said counting means for providing said vertical output pulses, the improvement comprising:

vertical synchronizing pulse gating means for receiving said vertical synchronizing pulses and connected to said output means;

synchronism detecting means connected to said gating means and to said counting means for detecting whether said counting means is in-synchronism or out-of-synchronism with said received vertical synchronizing pulses; and

gate enabling means connected to said synchronism detecting means, to said gating means, and to said counting means for enabling said gating means at a predetermined count of said counting means when said synchronism detecting means detects an in-synchronism condition and

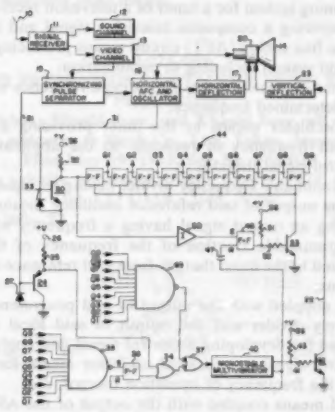


at a predetermined earlier count when said synchronism detecting means detects an out-of-synchronism condition, and for inhibiting said gating means after a vertical synchronizing pulse is coupled therethrough.

## 4,025,952
## VERTICAL SYNCHRONIZING CIRCUIT

**Robert R. Eckenbrecht, East Bethany, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.**

**Filed June 9, 1976, Ser. No. 694,239**
**Int. Cl.² H04N 5/04**
**U.S. Cl. 358—158** **9 Claims**




1. A vertical synchronizing circuit for providing vertical output pulses in synchronism with vertical synchronizing pulses contained in a composite video signal comprising:

means for providing said vertical synchronizing pulses;

means for providing pulses synchronized with horizontal synchronizing pulses contained in said composite video signal;

a vertical synchronizing pulse gate connected to said means for providing vertical synchronizing pulses;

a counter connected to said means for providing pulses synchronized with horizontal synchronizing pulses for counting the pulses therefrom;

gate enabling means connected to said counter and to said vertical synchronizing pulse gate for enabling said gate at a predetermined count of said counter prior to the expected receipt of each vertical synchronizing pulse;

a vertical output pulse generator connected to said gate and

to said gate enabling means for receiving said vertical synchronizing pulses from said gate and for providing the vertical output pulses in response thereto, said gate enabling means inhibiting said gate when each vertical output pulse is provided; and

resetting means connected to said vertical output pulse generator and to said counter for resetting said counter when each vertical output pulse is provided.

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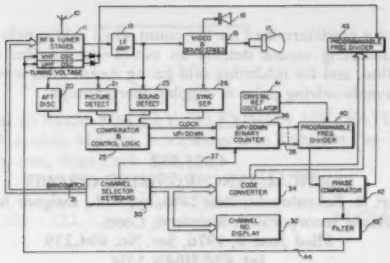
## 4,025,953

## FREQUENCY SYNTHESIZER TUNING SYSTEM FOR TELEVISION RECEIVERS

**Sotirios Sideris, Des Plaines, Ill., assignor to Quasar Electronics Corporation, Franklin Park, Ill.**

**Filed Nov. 26, 1975, Ser. No. 635,716**
**Int. Cl.² H04N 5/44**
**U.S. Cl. 358—191** **11 Claims**



1. A tuning system for a tuner of a television receiver capable of receiving a composite television signal and including automatic fine tuning (AFT) circuit means producing an AFT signal, said system including in combination:

reference oscillator means providing a reference signal at a predetermined frequency;

local oscillator means in the tuner providing a variable output frequency in response to the application of a control signal thereto;

a programmable frequency divider having an input coupled to the output of said reference oscillator means for producing an output signal having a frequency which is a programmable fraction of the frequency of the signal applied to the input thereto from said reference oscillator means;

means coupled with the output of said programmable frequency divider and the output of said local oscillator means for developing a control signal and applying such control signal to said local oscillator means for controlling the frequency of operation thereof; and

control means coupled with the output of the AFT circuit means and further coupled with said programmable frequency divider for controlling said frequency divider to change said programmable fraction in response to predetermined signal conditions of the AFT signal.

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## 4,025,954

## PIEZOELECTRIC DEVICE FOR IMAGE READOUT

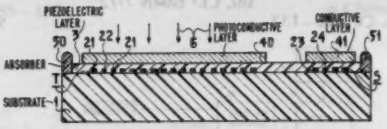
**Alain Bert, Paris, France, assignor to Thomson-CSF, Paris, France**

**Filed Mar. 21, 1975, Ser. No. 560,921**
**Claims priority, application France, Mar. 26, 1974, 74.10301**
**Int. Cl.² H04N 3/14**
**U.S. Cl. 358—213** **13 Claims**

1. An electric image read-out device providing a modulated electrical signal constituting the image read-out signal, comprising:

a substrate made of a non-piezoelectric material:

an electro-mechanical transducer for generating an elastic wave under the action of an electric signal, deposited onto said substrate and comprising a thin layer of piezoelectric material having two surfaces, two interleaved comb shaped electrodes deposited onto one of said surfaces, and a layer of photoconductive material in electrical contact with the other of said surfaces, onto which said image is projected, said transducer thus modulating said elastic wave while generating said elastic wave on the surface of said substrate;



output means for converting said modulated elastic wave into said electric read-out signal.

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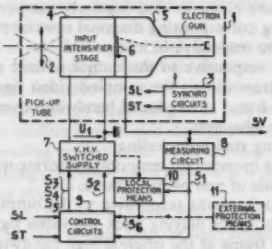
## 4,025,955

## LOW LIGHT LEVEL IMAGE PICK-UP TUBE ARRANGEMENT

**Jean-Claude Grallien, and Ange Corbel, both of Paris, France, assignors to Thomson-CSF, Paris, France**

**Filed Sept. 29, 1975, Ser. No. 617,732**
**Claims priority, application France, Oct. 1, 1974, 74.33032**
**Int. Cl.² H04N 5/19**
**U.S. Cl. 358—219** **11 Claims**

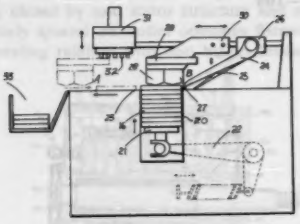


1. A low light level television pick-up tube arrangement comprising: optical means for focussing radiation received from an observed field; an image pick-up tube for receiving the said focussed radiation and for delivering a video signal, the said pick-up tube comprising image intensifying means arranged between the said optical means and an electron gun from which said video signal is derived by electronically scanning a target, said image intensifying means comprising an input intensifier stage which receives the said focussed radiation; a measuring circuit for generating an error signal representative of the difference between the existing mean value of the said video signal and a predetermined mean reference value; a very high voltage switched supply for supplying a switched voltage to the said input intensifier stage and a control circuit for generating from the said error signal control signals for controlling the said switched supply to provide predetermined variations in the amplitude and duration of the said switched voltage to automatically control the gain of the said intensifying means; and protection means to protect said tube against sudden and too intense illumination, said protection means generating an obturation signal applied to the said control circuit for controlling the said switched supply to provide an instantaneous downward change in the said switched voltage to cancel out the gain of the said intensifier means.

## 4,025,956
## PRINTING MACHINE

Tetsuzo Nozaki, Kyoto, and Yoshihisa Ogawa, Nagaokakyo, both of Japan, assignors to Nozaki Insatsu Shigyo Kabushiki Kaisha, Kyoto, Japan

Filed Dec. 30, 1975, Ser. No. 645,476
Int. Cl.² G11B 13/02; G01D 15/00; G06K 7/08
U.S. Cl. 360—2 2 Claims

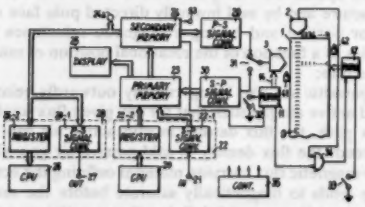


1. An apparatus for printing an on and magnetically recording on tickets having a surface a part of wich is a magnetizable material, said apparatus comprising a surface along which sai dtickets are movable, means disposed above said surface for engaging a ticket and moving it along said surface to a recording and printing position, a printing means having type elements thereon movable perpehdicularly to said surface at said recording and printing position for printing on a ticket at said position, a magnetic head means mounted on said apparatus for movement along said surface and having a magnetic recording head thereon spaced above said surface by a distance corresponding to the thickness of the ticket to be printed, said magnetic head means being movable from a position spaced along said surface from said printing position in one direction to a position past said printing position in the other direction, and an inking means on said magnetic head means on the side opposite the said surface and engageable with the type elements on said printing means as said magnetic head means moves past said printing position, whereby on te return movment of said magnetic head means a current can be passed through said recording head for recording magnetic information on a ticket at said printing position.

## 4,025,957
## MAGNETIC RECORDING SYSTEM USING MAGNETIC TAPE

Tasaku Wada, and Satoru Nakabo, both of Tokyo, Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Japan

Filed Oct. 15, 1975, Ser. No. 622,471
Claims priority, application Japan, Oct. 15, 1974, 49-118477; Nov. 13, 1974, 49-130006
Int. Cl.² G11B 5/09, 21/02
U.S. Cl. 360—48 5 Claims

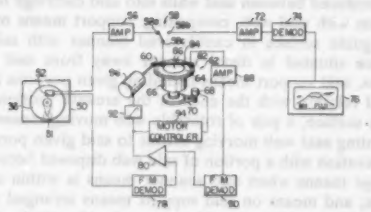



1. A magnetic recording system, comprising:
magnetic record medium, having a transverse width dimension, for successively recording codes, block by block, thereon along the transverse width dimension;
magnetic head means magnetically coupled with said magnetic record medium for recording said code blocks on the magnetic record medium and for reading out said recorded code blocks from the magnetic record medium;
head drive means operatively coupled to said magnetic head means for reciprocating said magnetic head relative to said magnetic record medium and widthwise thereof;
primary memory means including a plurality of primary right-left shift registers for storing, block by block, codes in a parallel signal configuration;
input means connected to said primary memory means for applying input codes to said primary right-left shift registers in the parallel signal configuration;
secondary memory means including a plurality of secondary right-left shift registers connected to said primary right-left shift registers of said primary memory means for storing, block by block, in the parallel signal configuration codes transferred from said primary right-left shift registers;
detection means for detecting a sweep direction of said magnetic head means relative to the magnetic record medium widthwise of the magnetic record medium;
first shift-control means connected to said secondary memory means and said detection means for shifting the code blocks stored in said secondary right-left shift registers in either the right shift direction or the left shift direction in accordance with the sweep direction of the magnetic head means detected by said detection means so the shift direction of the code blocks conforms with the sweep direction of said magnetic head means;
first connection means between the outputs of said secondary right-left shift registers and said magnetic head means for applying, block by block, read-out codes from said secondary right-left shift registers to said magnetic head means for recording a read-out code block on the magnetic record medium during each widthwise sweep of the magnetic head means.

## 4,025,958
## JITTER PREVENTION SYSTEM FOR VIDEO SIGNAL PROCESSING

Isamu Orima; Hitoshi Sone, and Kiyoshi Sone, all of Tokyo, Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed May 29, 1975, Ser. No. 582,029
Claims priority, application Japan, June 1, 1974, 49-62069
Int. Cl.² G11B 15/46, 21/02
U.S. Cl. 360—73 10 Claims




1. In a method of transferring electrical data from a first moving storage element of a first storage means to a second moving storage element of a second storage means, the second storage means having a write member to write the electrical data on the second storage element, the second moving storage element having equally spaced reference marks, the first storge element being designed to move at a first predetermined speed but the actual speed of the first storage element deviating slightly from the first predetermined speed, the second storage element being designed to move at a second predetermined speed, the electrical data including signals representing equally spaced intervals of time, the steps of:
a. sensing the frequency of occurrence of the signals which denote the actual speed of the first storage element;

b. sensing the frequency of occurrence of the reference marks which denote the speed of the second storage element relative to the write member;

c. comparing the frequency of occurence of the signals to the frequency of occurrence of the reference marks; and

d. controlling the actual speed of the second storage element and controlling movement of the write member relative to the second storage element to thereby provide for relative speed control between the second storage element and the write member so that the ratio of the actual speed of the first storage element to the first predetermined speed is equal to the ratio of the speed of the second storage element relative to the write member to the second predetermined speed.

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**4,025,959**

## RECORDER-REPRODUCER SYSTEM

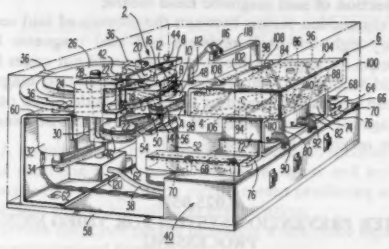
**Henry Ray Warren, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.**

**Continuation of Ser. No. 372,002, June 21, 1973, abandoned, which is a continuation of Ser. No. 172,015, Aug. 16, 1971, abandoned. This application Sept. 29, 1975, Ser. No. 617,611**

**Claims priority, application United Kingdom, May 16, 1971, 6969/71; Apr. 5, 1971, 8688/71**

**Int. Cl.² G11B *15/24, 15/62, 15/66, 23/04***

**U.S. Cl. 360—85** **12 Claims**



1. A system for use with a cartridge having walls for enclosing a pair of web storage means and a web disposed therebetween which includes means for providing movably mounted web guide means, said system being of the type in which trnsducer means scan through an arcuate guide surface which is introduced between said walls into said cartridge for cooperation with said web, comprising: support means mounting said guide surface in cantilevered manner with said guide surface situated in distal manner away from said support means, said support means including given portions in juxtaposed relation with the ends of the arcuate portion of said guide surface, a pair of rotatable web moving means, means mounting said web morving means to said given portions for cooperation with a portion of said web disposed between said storage means when said scanner means is within said cartridge, and means on said support means arranged to coact with said movable web guide means of said cartridge to establish a desired angular orientation between said web guide means and said guide surface when said web is disposed in cooperative relation with said arcuate guide surface.

7. In a cartridge for use with a system in which transducer means scan a helical section guide surface whose central axis is angled with respect to the major dimension of said cartridge and which transducer means is introduced into said cartridge for transducing information from a record web disposed between web storage reels within said cartridge, apparatus for maintaining said web in desired spacial relation with respect to said guide surface, comprising: web guide means within said cartridge between said reels and said web, and mounting means coupling said guide means to said cartridge in movable manner to render said guide means displaceable in at least two dimensions with respect to said guide surface.

**4,025,960**

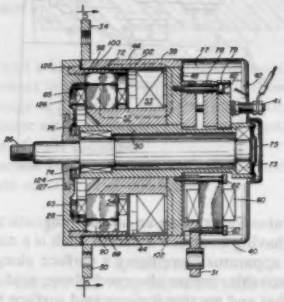
## VARIABLE RELUCTANCE A.C. ELECTRICAL GENERATOR AND METHOD OF MAKING SAME

**Alden J. Gray, Ashfield, Mass.; Ian S. Sanderson, Kennebunk, and John C. Hardy, Gorham, both of Maine, assignors to Maremont Corporation, Chicago, Ill.**

**Continuation of Ser. No. 522,294, Nov. 8, 1974. This application June 2, 1976, Ser. No. 692,046**

**Int. Cl.² H02K *19/20***

**U.S. Cl. 310—168** **13 Claims**



1. A variable reluctance inductor alternator having relatively large diameter, large area air gaps thereby requiring minimum magnetomotive force to transfer magnetic flux therethrough for a given design size and having efficient cooling air flow structures integrated therewith said alternator comprising:

a stator structure having magnetic flux carrying material therein including a radially inwardly directed face and a radially directed tooth face, said stator structure including said faces defining an annular cavity closed at one end and open at the other,

a rotor structure being mounted for rotational movement with respect to said stator structure in a position to close the open end of said annular cavity,

said rotor structure including an annular portion having magnetic flux carrying material therein disposed in said annular cavity and including a radially outwardly directed face and a radially inwardly directed pole face;

said stator structure and said rotor structure being arranged to define at least one mean magnetic flux carrying path passing through the magnetic flux carrying material of both said stator structure and said rotor structure, said flux path including (1) at least one parasitic air gap defined by said radially inwardly directed face of said stator structure and said radially outwardly directed face of said rotor portion and having a substantially constant magnetic reluctance and (2) at least one active air gap defined by said outwardly directed tooth face of said stator structure and by said inwardly directed pole face of said rotor portion and having a magnetic reluctance which varies as a function of the rotational position of said rotor structure;

said parasitic air gap being radially outwardly relative to said active air gap such that for any given flux level in the flux path, the flux density in said active air gap always exceeds the flux density in said passive air gap whereby the magnetic flux carrying material defining the active air gap tends to magnetically saturate before the magnetic flux carrying material defining the parasitic air gap thus effectively removing the parasitic air gap as a serious design restraint;

flux establishing means within said annular cavity for establishing a quiescent magnetomotive force within said flux path such that a magnetic flux is established in said active

air gap which flux varies as a function of the rotational position of said rotor structure and inversely with respect to the variable reluctance of said active air gap,

electrical output means operatively associated with said active air gap for providing an induced electrical output therefrom in response to varying flux in said active air gap,

said rotor structure having a plurality of annularly spaced fan blades within the open end portion of the annular cavity closed by said stator structure and a plurality of annularly spaced air outlet openings formed therein in cooperating relation with said blades leading exteriorly from said annular cavity at the open end portion thereof closed by said rotor structure,

said stator structure having a plurality of annularly spaced air inlet openings leading interiorly into said annular cavity at the one end thereof so that upon rotational movement of said rotor structure the movement of said blades will cause cooling air to be drawn interiorly within the one end portion of said annular cavity through said inlet openings, past said flux establishing means, said electrical output means and the material defining said active air gap and to be blown exteriorly from the other end portion of said annular cavity directly through the cooperating outlet openings in said rotor structure.

# DESIGN PATENTS

## GRANTED MAY 24, 1977

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 006–175 | 244,417 |
| 013–024 | 244,463 |
| 014–043 | 244,464 |
| 013–030 | 244,465 |
| 014–086 | 244,466 |
| 014–036 | 244,467 |
| 014–057 | 244,468 |
| 014–057 | 244,469 |
| 014–088 | 244,470 |
| 011–143 | 244,471 |
| 014–068 | 244,472 |
| 014–073 | 244,481 |
| 024–008 | 244,483 |
| 028–011 | 244,484 |
| 028–059 | 244,485 |

# DESIGN PATENTS

## GRANTED MAY 24, 1977

### ERRATA

| Class | Patent No. | Page |
|---|---|---|
| 006-173 | 244,417 | |
| 013-024 | 244,462 | |
| 014-043 | 244,464 | |
| 013-030 | 244,465 | |
| 014-036 | 244,466 | |
| 014-034 | 244,467 | |
| 014-027 | 244,468 | |
| 014-027 | 244,469 | |
| 014-089 | 244,470 | |
| 017-143 | 244,471 | |
| 014-052 | 244,472 | |
| 014-073 | 244,481 | |
| 024-008 | 244,483 | |
| 023-011 | 244,484 | |
| 028-009 | 244,485 | |

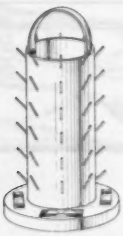
# DESIGNS

MAY 24, 1977

244,406
PROTECTIVE SHOE
Tibor Schonbrun, Montreal, and Victorin Tremblay, Laval, both of Canada, assignors to Genesport Industries Ltd., Montreal, Canada
Filed Mar. 3, 1975, Ser. No. 554,621
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—271

244,407
SUPPORT STAND FOR FLOWER POTS OR THE LIKE
Phillip A. Gass, 241 S. 89th St., Omaha, Nebr. 68114
Filed Dec. 12, 1975, Ser. No. 640,057
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—28

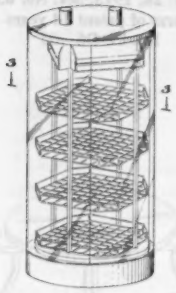
244,408
DISPLAY RACK FOR SPOOLS OF THREAD
Lottie Jennings, 3107 Graciosa Lane, Anaheim, Calif. 92804
Filed Mar. 29, 1976, Ser. No. 671,602
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—28



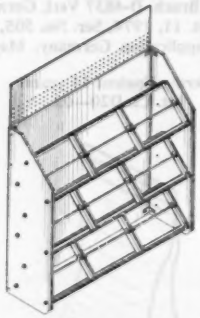
244,409
COMBINED TABLE AND MULTIPLE SEATING UNIT
William D. Arnold, St. Louis, Mo., assignor to Lee-Rowan Company, St. Louis, Mo.
Filed Nov. 26, 1975, Ser. No. 635,329
Term of patent 14 years
Int. Cl. D6—*05*
U.S. Cl. D6—45

244,410
DISPLAY STAND FOR PACKAGED ARTICLES
Ingo Pietsch, 31 Im Bruch, D-4837 Verl, Germany
Filed Sept. 11, 1974, Ser. No. 505,117
Claims priority, application Germany, May 14, 1974, 20 MR 3201
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—85

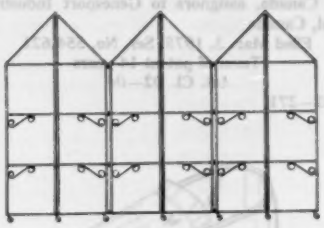
244,411
ROTATABLE ADVERTISING DISPLAY CASE
Aery Haggerty, 5130 Reynier Ave., Los Angeles, Calif. 90056
Filed June 21, 1976, Ser. No. 698,127
Term of patent 14 years
Int. Cl. D6—*04*; D20—*02*
U.S. Cl. D6—146



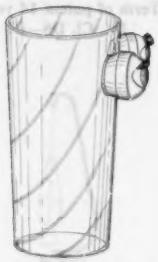
244,412
MERCHANDISE DISPLAY RACK
Allen F. Messenger, Maryville, Mo., assignor to Nixdorff-Krein Manufacturing Company, St. Louis, Mo.
Filed Dec. 29, 1975, Ser. No. 644,924
Term of patent 14 years
Int. Cl. D20—*02*; D6—*04*
U.S. Cl. D6—186



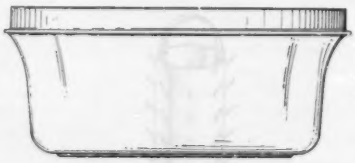
244,413
FOLDABLE SHELF UNIT OR SIMILAR ARTICLE
Allen E. Coles, Oklahoma City, Okla., assignor to W & W Steel Company, Oklahoma City, Okla.
Filed Aug. 20, 1975, Ser. No. 605,981
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—190



244,414
TUMBLER
Arnold Nelson, 75 Hendricks Ave., Staten Island, N.Y. 10301
Filed June 5, 1975, Ser. No. 584,210
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—8

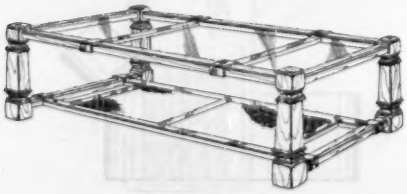


244,415
BOWL OR THE LIKE
Robert H. C. M. Daenen, Hekelgem, Belgium, assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Sept. 10, 1975, Ser. No. 612,151
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—23



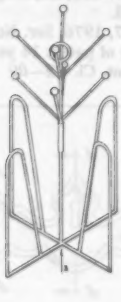
244,416
**VEGETABLE CHOPPER**
Karl Zysset, Lyss, Switzerland, assignor to K. Zysset & Co. AG, Lyss, Switzerland
Filed July 10, 1975, Ser. No. 594,947
Claims priority, application Switzerland, Jan. 17, 1975, 60304/75
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—155

244,417
**TABLE**
Marion E. Pratt, Greensboro, N.C., assignor to Gordon's Inc. (Entire), Johnson City, Tenn.
Filed Feb. 2, 1976, Ser. No. 654,341
Term of patent 3½ years
Int. Cl. D6—*03*
U.S. Cl. D6—175

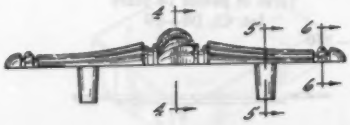


244,418
**FLOWER HOLDING TRASH RECEPTACLE**
Nicholas J. Chetta, Jr., 5865 Memphis St., New Orleans, La. 70124
Filed Sept. 29, 1975, Ser. No. 617,584
Term of patent 14 years
Int. Cl. D7—*07*
U.S. Cl. D7—191

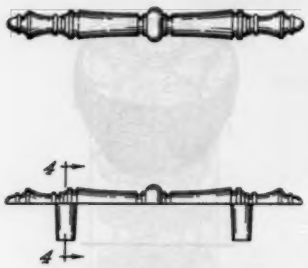
244,419
**BOOT AND MITT DRYER**
Alwyn Anderson, R.R. No. 14, Thunder Bay, Ontario, Canada (P7B 5E5)
Filed Dec. 8, 1975, Ser. No. 638,379
Term of patent 14 years
Int. Cl. D7—*05*; D6—*99*
U.S. Cl. D7—196



244,420
**PULL**
LaVerne E. Clayton, Rockford, Ill., assignor to Amerock Corporation, Rockford, Ill.
Filed Feb. 27, 1976, Ser. No. 662,231
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—318



244,421
PULL
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.
Filed Feb. 27, 1976, Ser. No. 662,219
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—317



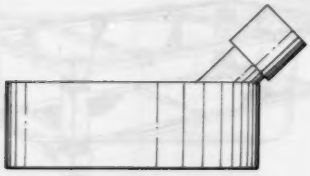
244,422
ESCUTCHEON
LaVerne E. Clayton, Rockford, Ill., assignor to Amerock Corporation, Rockford, Ill.
Filed Feb. 27, 1976, Ser. No. 662,106
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—350

244,423
WALL PLATE
Joan Grieb, 125 E. 87th St., New York, N.Y. 10028
Filed Oct. 20, 1975, Ser. No. 624,084
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—350

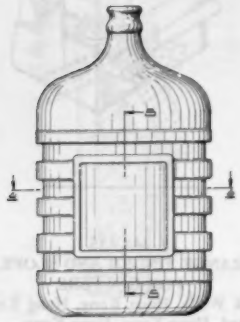
244,424
DISPENSING CONTAINER FOR LIQUID MATERIAL
Tor Petterson, 31248 Palos Verdes Drive West, Palos Verdes Peninsula, Calif. 90274
Filed Oct. 23, 1975, Ser. No. 625,031
Term of patent 7 years
Int. Cl. D9—*01*
U.S. Cl. D9—9

244,425
BOTTLE
Thomas Aldrich, Spring Valley, N.Y., and Albert Torongo, Yardley, Pa., assignors to The Clorox Company, Oakland, Calif.
Filed Mar. 24, 1975, Ser. No. 561,612
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—39

244,426
LIQUID MEDICATION DISPENSER
Fred H. Lowe, P.O. Box 35963, Dallas, Tex. 75225
Filed Oct. 16, 1975, Ser. No. 623,182
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—83

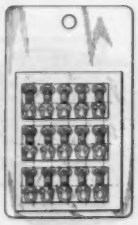


244,427
**BOTTLE**
Warren J. Schieser, and Stanley E. Vickers, both of Columbus, Ohio, assignors to Corco, Inc., Worthington, Ohio
Filed Oct. 23, 1975, Ser. No. 624,740
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—73

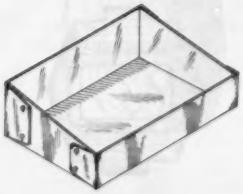


244,429
**PACKAGE OF SNAP FASTENERS AND ATTACHING TOOL**
Lee Richard Gardner, New York, N.Y., assignor to Dyno Merchandise Corporation, Elmhurst, N.N.Y.
Filed Jan. 12, 1976, Ser. No. 648,612
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—192

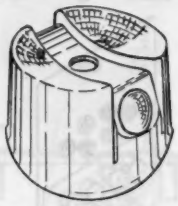
244,428
**PACKAGE OF HOOK AND EYE SETS**
Lee Richard Gardner, New York, N.Y., assignor to Dyno Merchandise Corporation, Elmhurst, N.Y.
Filed Jan. 12, 1976, Ser. No. 648,611
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—192



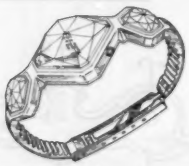
244,430
**DISPLAY BOX**
John M. Larkin, 6304 Colby Ave., Des Moines, Iowa 50311
Filed Nov. 27, 1974, Ser. No. 527,624
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—242



244,431
ACTUATOR CAP FOR A PRESSURIZED DISPENSER
Roger Anthony Butcher, Horndean, England, assignor to Aerosol Inventions & Development S.A. A.I.D.S.A.
Filed Nov. 28, 1975, Ser. No. 636,149
Claims priority, application United Kingdom, June 27, 1975, 971665/75
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—258

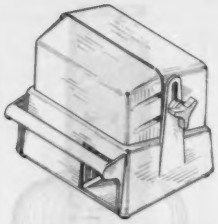


244,432
COMBINED WRISTWATCH AND BAND
Terry M. Haber, 3050 S. Bristol Apt. 8C, Santa Ana, Calif. 92707
Filed Dec. 11, 1975, Ser. No. 639,897
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D10—32

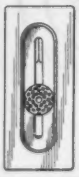


244,433
DIGITAL WRISTWATCH
Ruben Banks, 3822 White Cloud Ave., Skokie, Ill. 60076
Filed June 27, 1975, Ser. No. 590,813
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D10—38

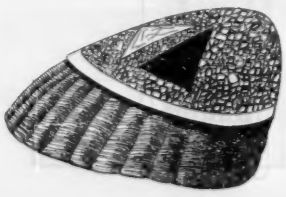
244,434
PORTABLE SONAR UNIT FOR FISHERMEN
John C. Moore, Tulsa, Okla., assignor to Lowrance Electronics, Inc., Tulsa, Okla.
Filed June 9, 1975, Ser. No. 585,318
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—46



244,435
COMBINED RANGE FINDER AND SLOPE INDICATOR FOR GOLFERS
Maynard Frank Wolfe, Hong Kong, Hong Kong, assignor to Prodev Limited, Hong Kong, Hong Kong
Filed Aug. 26, 1975, Ser. No. 607,980
Claims priority, application United Kingdom, Feb. 26, 1975, 970022/75
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—70

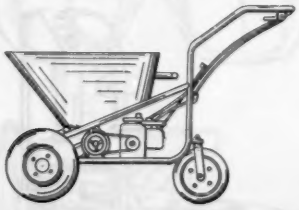


244,436
SHELL JEWELRY
Ronald W. Clotfelter, P.O. Box 748, Antlers, Okla. 74523
Filed Oct. 20, 1975, Ser. No. 623,663
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—1

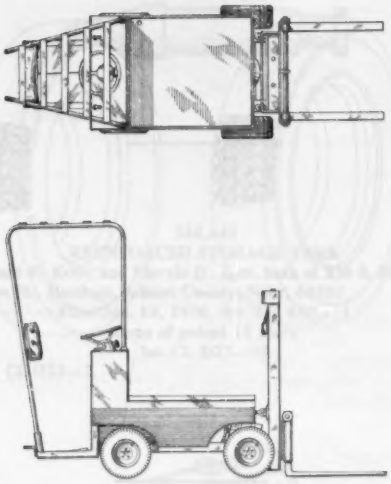


244,437
**TERRARIUM FOR PLANTS**
Carolyn D. Whorton, 1504 Cedar Cove, La Porte, Tex. 77571
Filed May 29, 1975, Ser. No. 581,820
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D11—145

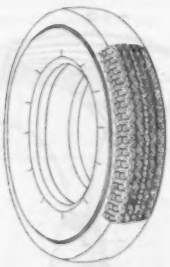
244,438
**SELF-PROPELLED WHEELBARROW**
Louis Samuels, 11808 Osceola Ave., Cleveland, Ohio 44108
Filed Jan. 19, 1976, Ser. No. 650,177
Term of patent 14 years
Int. Cl. D12—*02*
U.S. Cl. D12—24



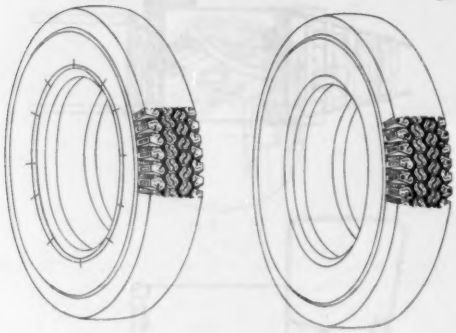
244,439
**FORK LIFT TRUCK**
Ellis R. Carr, 5561 Yuba Ave., and Joseph I. Magers, 14861 Givens Place, both of Westminster, Calif. 92683
Filed Feb. 23, 1976, Ser. No. 660,479
Term of patent 14 years
Int. Cl. D12—*05*
U.S. Cl. D12—57



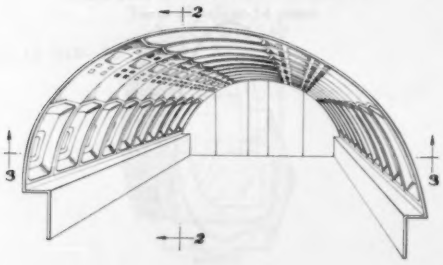
244,440
**VEHICLE TIRE**
Toshio Hayakawa, Kodaira, and Masahiro Takayama, Musashino, both of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan
Filed May 14, 1976, Ser. No. 686,282
Claims priority, application Japan, Dec. 26, 1975, 50-50907
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—143



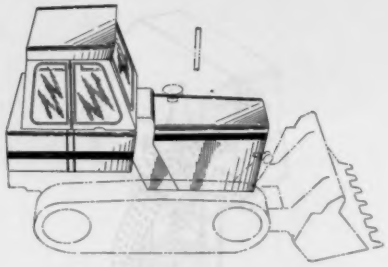
244,441
VEHICLE TIRE
Toshio Hayakawa; Misao Kawabata; Haruo Kawashima, all of Kodaira, and Masahiro Takayama, Musashino, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan
Filed May 11, 1976, Ser. No. 685,269
Claims priority, application Japan, Nov. 14, 1975, 50-44941
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—146



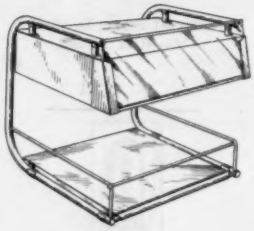
244,442
COMBINED WALL AND CEILING FOR AIRCRAFT
Rashad Shaker Greiss, Mercer Island, and James Stephen Yates, Seattle, both of Wash., assignors to The Boeing Company, Seattle, Wash.
Filed Sept. 22, 1975, Ser. No. 615,745
Term of patent 14 years
Int. Cl. D12—*199*
U.S. Cl. D12—195



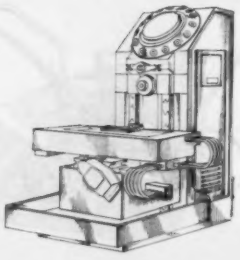

244,443
COMBINED CAB AND HOOD FOR A LOADER VEHICLE
James L. Borrill, Doncaster, England, assignor to International Harvester Company
Filed May 10, 1976, Ser. No. 684,702
Term of patent 14 years
Int. Cl. D15—*04*
U.S. Cl. D15—30



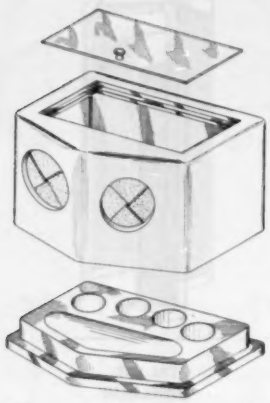
244,444
FOOD WARMER
Robert D. Bessler, Prarie Village, and Neil F. Hook, Mission, both of Kans., assignors to Manley, Inc., Kansas City, Mo.
Filed May 6, 1976, Ser. No. 683,707
Int. Cl. D 15—*08*
U.S. Cl. D15—104



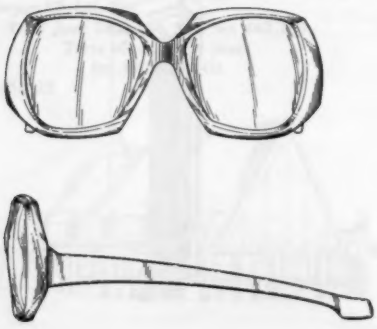
244,445
MACHINE TOOL
Earl R. Lohneis; Frank Zankl, both of Milwaukee; Clifford Brooks Stevens, Fox Point, and Thomas J. Green, West Bend, all of Wis., assignors to Kearney & Trecker Corporation, West Allis, Wis.
Filed May 6, 1976, Ser. No. 683,699
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—122



244,446
PHOTOGRAPHIC PROCESSING CONTAINER
Thomas H. Maass, 3500 W. Manchester, Inglewood, Calif. 90305
Filed June 13, 1975, Ser. No. 586,627
Term of patent 14 years
Int. Cl. D16—*04*
U.S. Cl. D16—33

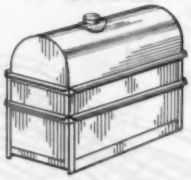


244,447
PAIR OF SPECTACLES
David W. Johnsen, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.
Filed Oct. 28, 1975, Ser. No. 625,981
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65



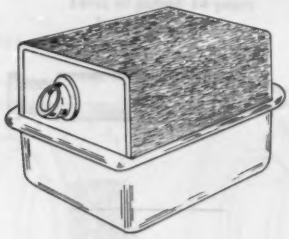
244,448
ARROW POINT
Vern A. Bonine, and Arlyn E. Bonine, both of 3310 Pierce Blvd., Racine, Wis. 53405
Filed Nov. 10, 1975, Ser. No. 630,082
Term of patent 3½ years
Int. Cl. D22—*03*
U.S. Cl. D22—12

244,449
REENFORCED STORAGE TANK
Donald R. Kerr, and Marvin D. Kerr, both of 220 S. Burlington St., Hastings, Adams County, Nebr. 68901
Filed Jan. 19, 1976, Ser. No. 650,171
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—2

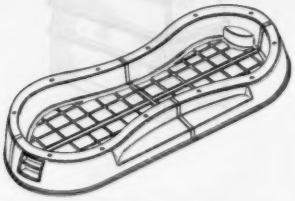


244,450
HEATER ADAPTER FOR USE WITH A FLOOR TYPE HEATING UNIT
Don A. Taylor, 216 Mills St., Wadsworth, Ohio 44281
Filed Mar. 11, 1976, Ser. No. 666,014
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—77

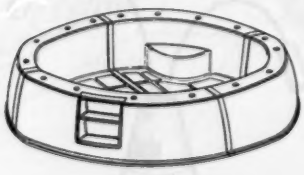
244,451
VAPORIZER
Narbik A. Karamian, 5117 Wilson Lane, Bethesda, Md. 20014
Filed July 8, 1975, Ser. No. 594,102
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—148



244,452
SWIMMING POOL
Masao Ohshiro, Hamamatsu, Japan, assignor to Yamaha, Hatsudoki Kabushiki Kaisha
Filed July 23, 1974, Ser. No. 490,928
Claims priority, application Japan, Jan. 25, 1974, 49-3116; Jan. 25, 1974, 49-3115; Jan. 25, 1974, 49-3114; Jan. 25, 1974, 49-3113
Term of patent 14 years
Int. Cl. D25—*99*
U.S. Cl. D25—2



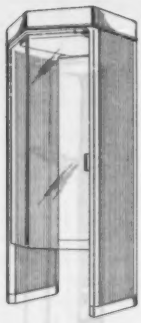
244,453
SWIMMING POOL
Masao Ohshiro, Hamamatsu, Japan, assignor to Yamaha, Hatsudoki Kabushiki Kaisha
Division of Ser. No. 490,928, July 23, 1974. This application Mar. 3, 1976, Ser. No. 662,671
Claims priority, application Japan, Jan. 25, 1974, 49-3114; Jan. 25, 1974, 49-3115; Jan. 25, 1974, 49-3116; Jan. 25, 1974, 49-3113
Term of patent 14 years
Int. Cl. D25—*99*
U.S. Cl. D25—2



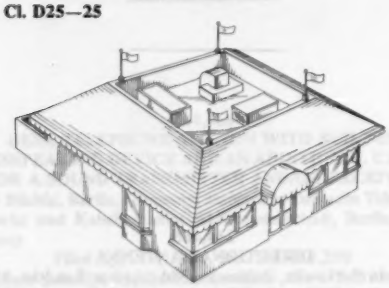
244,454
TELEPHONE STAND
Richard Arthur Crump; John Scott Gibson, both of Ottawa, and Allan Joseph Solar, Arnprior, all of Canada, assignors to Northern Electric Company Limited, Montreal, Canada
Filed Aug. 13, 1975, Ser. No. 604,142
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—16

244,455
TELEPHONE STAND
Richard Arthur Crump; John Scott Gibson, both of Ottawa, and Allan Joseph Solar, Arnprior, all of Canada, assignors to Northern Electric Company Limited, Montreal, Canada
Filed Aug. 13, 1975, Ser. No. 604,143
Term of patent 14 years
Int. Cl. D25—*99*
U.S. Cl. D25—16

244,456
TELEPHONE BOOTH
Richard Arthur Crump; John Scott Gibson, both of Ottawa, and Allan Joseph Solar, Arnprior, all of Canada, assignors to Northern Electric Company Limited, Montreal, Canada
Filed Aug. 13, 1975, Ser. No. 604,353
Term of patent 14 years
Int. Cl. D25—*99*
U.S. Cl. D25—16

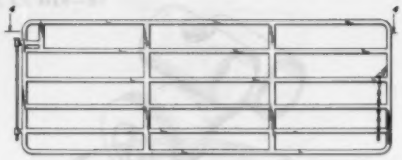


244,457
BUILDING
I. Lorraine Dickerson, 8111 E. Broadway, Apt. 403, Tucson, Ariz. 85710
Filed Aug. 6, 1975, Ser. No. 602,318
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—25

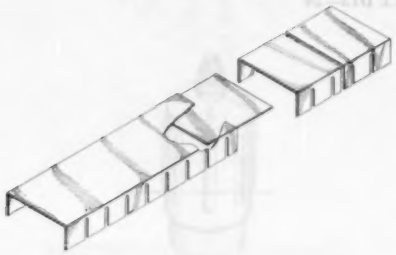


244,458
RESTAURANT BUILDING
Richard C. Wallace, Dallas, Tex., assignor to Grace Dobson Lutz, Corpus Christi, Tex.
Filed June 24, 1974, Ser. No. 482,159
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—22

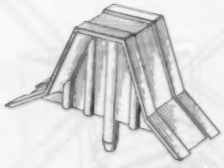
244,459
SWINGING GATE
Frank Kratky, Rist Canyon, Bellvue, Colo. 80512
Continuation of Ser. No. 451,791, March 18, 1974, Pat. No. 237,722. This application Sept. 10, 1975, Ser. No. 611,928
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D25—50



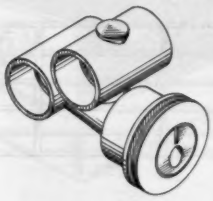
244,460
LAWN EDGING PANEL
James Harlan Jenkins, 6010 N. 26th St., Arlington, Va. 22207
Filed Oct. 3, 1975, Ser. No. 619,684
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D25—75



244,461
CORRUGATION END STOP FOR ROOFS
James W. Harter, Independence, Mo., assignor to Butler Manufacturing Company
Filed Dec. 17, 1975, Ser. No. 641,677
Term of patent 14 years
Int. Cl. D25—*99*
U.S. Cl. D25—92



244,462
WHIRLPOOL JET NOZZLE FOR BATHTUBS AND THE LIKE
Cleo D. Mathis, 1808 Potrero Ave., South El Monte, Calif. 91733
Filed Nov. 24, 1975, Ser. No. 634,496
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—34

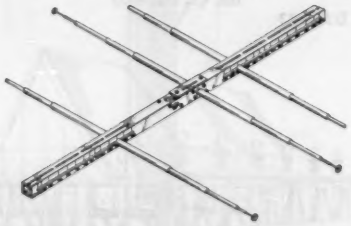


244,463
BOOT FOR CAPS AND CONNECTORS
Edwin B. Judd, East Greenwich, R.I., assignor to General Electric Company
Continuation of Ser. No. 465,054, April 29, 1974, abandoned. This application Apr. 8, 1975, Ser. No. 566,164
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—24

244,464
DATA DISPLAY CONSOLE
Myron Fulenwider Davis, Jr., Boca Raton, Fla., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Apr. 19, 1976, Ser. No. 678,012
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—43

244,465
ELECTRICAL OUTLET POLE OR SIMILAR ARTICLE
Paul Stoneman, Toronto, Canada, assignor to Electrovert Limited, Montreal, Canada
Filed Apr. 18, 1975, Ser. No. 569,402
Claims priority, application Canada, Oct. 23, 1974, 2310742
Term of patent 14 years
Int. Cl. D26—*99*
U.S. Cl. D13—30

244,466
DIRECTIONAL ANTENNA
Benjamin Berkowitz, Baltimore, Md.; Arthur Luedtke, Marietta, Ga.; William L. Kilpatrick, Austell, Ga., and William Ferrel Bentley, Smyrna, Ga., assignors to The United States of America as represented by the Field Operations Bureau of the Federal Communications Commission, Washington, D.C.
Filed Sept. 10, 1975, Ser. No. 611,937
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—86

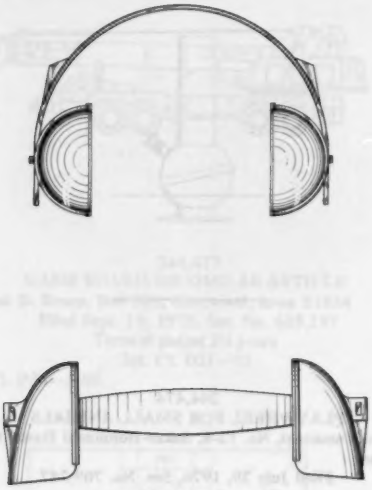


244,467

**SOUND INTENSIFYING RECEIVER**

Augustino A. Aquilino, Birmingham, Ala., assignor to Soundmasters, Inc., Birmingham, Ala.

Filed Sept. 11, 1975, Ser. No. 612,562
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—36

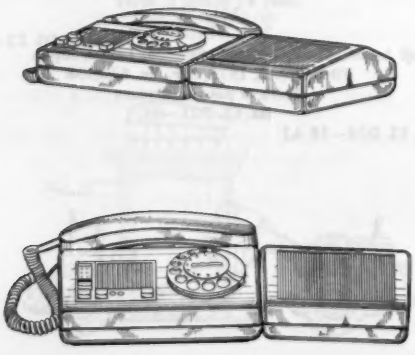


244,468

**DESK TELEPHONE STATION WITH BUILT-IN FREESPEAKING DEVICE AND AN ADDITIONAL CASING FOR A SOUND TRANSMITTER AND/OR RECEIVER**

Karl Büchin, Berlin, Germany, assignor to Deutsche Telephonwerke und Kabelindustrie Aktiengesellschaft, Berlin, Germany

Filed Apr. 19, 1976, Ser. No. 678,210
Claims priority, application Germany, Nov. 5, 1975, MR 020/75
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—57

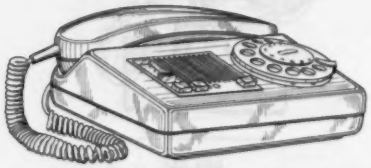


244,469

**DESK TELEPHONE STATION WITH BUILT-IN FREESPEAKING DEVICE**

Karl Büchin, Berlin, Germany, assignor to Deutsche Telephonwerke und Kabelindustrie Aktiengesellschaft, Germany

Filed Apr. 19, 1976, Ser. No. 678,211
Claims priority, application Germany, Nov. 5, 1975, MR 019/75
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—57

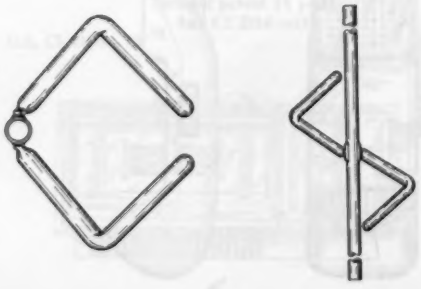


244,470

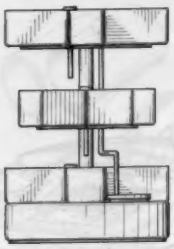
**TRANSMITTING ANTENNA**

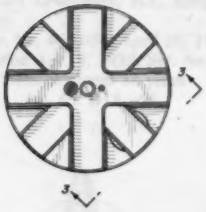
Richard D. Bogner, 4 Hunters Lane, Roslyn, N.Y. 11576

Filed May 21, 1976, Ser. No. 688,781
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—88



244,471
**PLANTER**
Raymond Thomas Cicci, 22740 Leonora Drive, Woodland Hills, Calif. 91364
Filed Oct. 14, 1975, Ser. No. 622,033
Term of patent 14 years
Int. Cl. D11—*02*; D6—*04*
U.S. Cl. D11—143



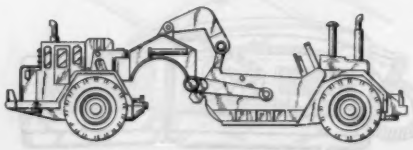


244,472
**HAND HELD RADIO TRANSCEIVER**
Milton Hiller, North Woodmere, N.Y., assignor to Windsor Industries, Inc., Melville, N.Y.
Filed Aug. 18, 1976, Ser. No. 715,955
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—68

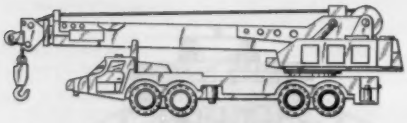
244,473
**SMOKING PIPE**
Eric Karl, Los Angeles, Calif., assignor to Sarah's Family, Inc.
Filed Feb. 9, 1976, Ser. No. 656,481
Term of patent 14 years
Int. Cl. D27—*02*
U.S. Cl. D27—3

244,474
**PLAYWHEEL FOR SMALL ANIMALS**
Tetsumi Yamazaki, No. 12-8, Sakae-Honmachi Ikeda, Osaka, Japan
Filed July 29, 1976, Ser. No. 709,747
Term of patent 14 years
Int. Cl. D30—*07*
U.S. Cl. D30—42

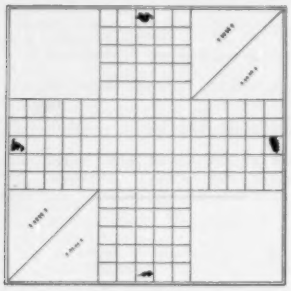
244,475
**TOY VEHICLE**
Kiyoji Asano, 27-23, 2-chome, Sumida, Tokyo, Japan
Filed Dec. 2, 1975, Ser. No. 636,938
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



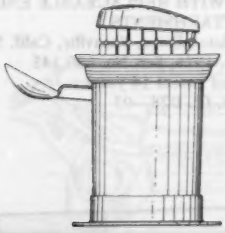
244,476
TOY VEHICLE
Kiyoji Asano, 2-27-23, Sumida, Sumida, Tokyo, Japan
Filed Dec. 2, 1975, Ser. No. 637,004
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



244,477
GAME BOARD, OR SIMILAR ARTICLE
Michael D. Bruce, Box 505, Glenwood, Iowa 51534
Filed Sept. 19, 1975, Ser. No. 615,117
Term of patent 3½ years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS

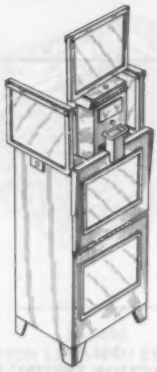


244,478
TOY BANK
Ietatsu Watanabe, No. 9-10, Tateishi, Katsushika, Tokyo, Japan
Filed June 19, 1975, Ser. No. 588,619
Term of patent 14 years
Int. Cl. D31—*00*
U.S. Cl. D34—11 R

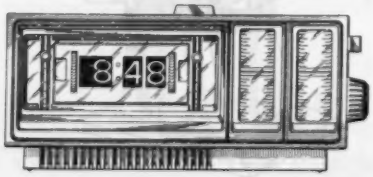


244,479
SCOOTER
Mario A. Pasin, Oakbrook, Ill., assignor to Radio Steel & Mfg. Co., Chicago, Ill.
Filed Jan. 23, 1976, Ser. No. 651,944
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AT

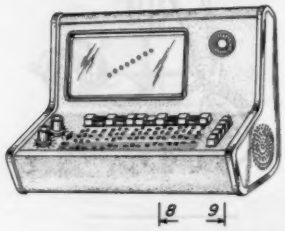
244,480
NEWSPAPER VENDING MACHINE
Jacob Burck, 921 Castlewood Terrace, Chicago, Ill. 60640
Filed July 25, 1975, Ser. No. 599,049
Term of patent 14 years
Int. Cl. D20—*01*
U.S. Cl. D52—3 R



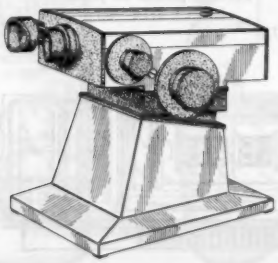
244,481
FM/AM DIGITAL CLOCK RADIO
John S. Kolwaite, Syracuse, N.Y., assignor to General Electric Company
Filed Dec. 5, 1975, Ser. No. 638,016
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—73



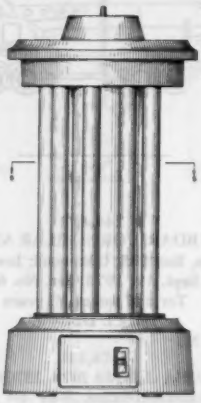
244,482
MUSIC TUNER
Takeshi Ishida, Yokohama, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan
Filed June 13, 1975, Ser. No. 586,622
Claims priority, application Japan, Dec. 13, 1974, 49-43816
Term of patent 14 years
Int. Cl. D17—99
U.S. Cl. D56—1 R



244,483
OPTICAL REFRACTION TESTING INSTRUMENT
John E. Toth, and Victor L. Copeland, both of San Diego County, Calif., assignors to Nerthus, Inc., Saratoga, Calif.
Filed Apr. 4, 1975, Ser. No. 565,110
Term of patent 3½ years
Int. Cl. D24—01
U.S. Cl. D24—8

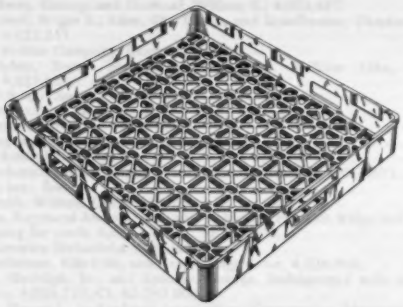


244,484
PERMANENT WAVE HEATING MACHINE
John R. Forsberg, 1159 S. Mitchell, Arlington Heights, Ill. 60005
Filed July 7, 1975, Ser. No. 593,711
Term of patent 14 years
Int. Cl. D28—03
U.S. Cl. D28—11

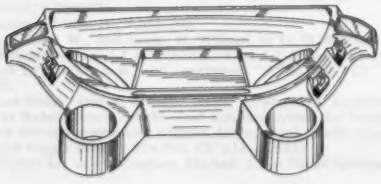


244,485
EMERY BOARD WITH REPLACEABLE END ATTACHMENTS
Lois C. Bates, 1426 C Alamo Drive, Vacaville, Calif. 95688
Filed Jan. 19, 1976, Ser. No. 650,145
Term of patent 14 years
Int. Cl. D28—03
U.S. Cl. D28—59

244,486
BAKERY TRAY OR THE LIKE
Lewis T. Johnson, and James C. Carroll, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.
Filed Dec. 19, 1974, Ser. No. 534,285
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D87—1 R

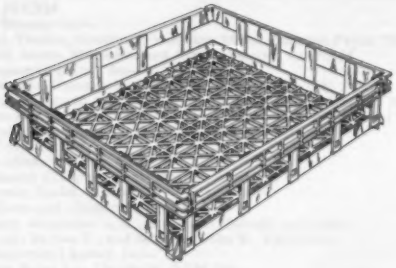


244,487
AUTOMOBILE CONSOLE TRAY
Wallace Jensen, 4900 S. 5200 W., Salt Lake City, Utah 84118
Filed Jan. 9, 1975, Ser. No. 539,815
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D87—1 R



244,488
COMPACT, CONCEALABLE PURSE
Patricia Surie; Rosella Shapiro, and Mathilde N. Shapiro, all of Chicago, Ill., assignors to Patricia Surie and Rosella Shapiro
Filed Jan. 6, 1975, Ser. No. 538,874
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—3 D

244,489
BAKERY TRAY OR THE LIKE
Lewis T. Johnson, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.
Division of Ser. No. 434,005, Jan. 17, 1974, Pat. No. 239,337.
This application Sept. 18, 1975, Ser. No. 614,581
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R



244,490
COMBINATION LENS AND EYEGLASS CASE
William D. Peterson, 15225 S. River Drive, Miami, Fla. 33169
Filed Sept. 4, 1975, Ser. No. 610,096
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—9

# LIST OF PATENTEES

## TO WHOM

## PATENTS WERE ISSUED ON THE 24TH DAY OF MAY, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

**A.C. Nielsen Company:** *See—*
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**A. E. Staley Manufacturing Company:** *See—*
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**A. H. Robins Company, Incorporated:** *See—*
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**A L O S AG:** *See—*
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**A. Nattermann & Cie GmbH:** *See—*
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**A. O. Smith-Inland, Inc.:** *See—*
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**A-T-O Inc.:** *See—*
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**Abbey, Duane L., to Rockwell International Corporation.** Master/slave clock arrangement for providing reliable clock signal. 4,025,874, Cl. 331-55.000.

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**Abe, Hiroshi:** *See—*
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**Abo, Masahiro:** *See—*
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**Abonnenc, Jean.** Automatic volumetric device for taking samples of granular or powdered material. 4,024,765, Cl. 73-422.0TC.

**ACF Industries, Incorporated:** *See—*
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**Acme-Lite Manufacturing Co.:** *See—*
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**Acres, Gary James Keith, to Johnson Matthey & Co., Limited.** Catalysis. 4,025,606, Cl. 423-245.000.

**Acro Products, Inc.:** *See—*
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**Actionite Company, Inc.:** *See—*
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**Acton, Daniel D., to Anchor Hocking Corporation.** Tamperproof molded package. 4,024,976, Cl. 215-32.000.

**Adams, Anthony Lionel; and Head, Claude Dedmond, III, to Texas Instruments Incorporated.** Semiconductor slice prealignment system. 4,024,944, Cl. 198-394.000.

**Adams Rite Products, Inc.:** *See—*
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**Adawi, Marwan K.; Briggs, Allan D.; DeLosh, Robert G.; and Smith, Carol S., to Ford Motor Company.** Method of improving the operational capacity of three-way catalysts. 4,024,706, Cl. 60-274.000.

**Addeo, Eric John, to Bell Telephone Laboratories, Incorporated.** Method and apparatus for radio system cochannel interference suppression. 4,025,853, Cl. 325-55.000.

**Addressograph Multigraph Corporation:** *See—*
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**Adelstein, Gilbert W.; and Sause, H. William, to G. D. Searle & Co.** 2- 3-[4-Azatricyclo(4.3.1.1$^{3,8}$)undecan-4-yl]-1,1-diphenylpropyl - 5-methyl-1,3,4-oxadiazole and congeners. 4,025,524, Cl. 260-296.00R.

**Adler, Karl-Heinz; Drews, Ulrich; Gloss, Erwin; and Kugelmann, Adolf, to Robert Bosch GmbH.** Fuel injection system for combination with internal combustion engines, having a universally connectable input trigger stage. 4,024,843, Cl. 123-32.0ED.

**Adney, Eugene M.; and Thompson, Michael E., to Texas Instruments Incorporated.** Programmed allocation of computer memory workspace. 4,025,904, Cl. 340-172.500.

**Adolph Coors Company:** *See—*
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**AGA Aktiebolag:** *See—*
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**AGFA-Gevaert, A.G.:** *See—*
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**Agrawal, Purushottam D., to Monsanto Company.** Method for production of hollow articles from injection molded preforms. 4,025,594, Cl. 264-97.000.

**Agulnek, Harry:** *See—*
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**Ahroni, Joseph M.** Optic fiber decorative device. 4,025,779, Cl. 240-10.00L.

**Aiba, Masahiko:** *See—*
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**Aiki, Kunio; Hitachi, Ltd.; Nakamura, Michiharu; and Umeda, Junichi, to Hitachi, Ltd.** Semiconductor laser device and a method for fabricating the same. 4,025,939, Cl. 357-18.000.

**Aikoh Co., Ltd.:** *See—*
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**Air Preheater Company, Inc., The:** *See—*
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**Akami, Hitoshi, to Agency of Industrial Science & Technology.** Optical color mixing method. 4,025,199, Cl. 356-190.000.

**Akgungor, Ali Caglar; and Bilgen, Ertugrul, to Canadian General Electric Company Limited.** Flow additive suspension system. 4,024,883, Cl. 137-5.000.

**Akita, Shigeyuki, to Nippon Soken, Inc.** Digital signal generator. 4,025,914, Cl. 340-204.000.

**Akiyama, Satoshi:** *See—*
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**Albert, Willard S., to Westinghouse Electric Corporation.** Insert dis-

posed in stand-off insulator and circuit interrupter including same. 4,025,741, Cl. 200-48.00R.

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Allen, Charles Anthony; Bailey, Thomas Albert, III; and Sincius, Joseph Anthony, to Du Pont de Nemours, E. I., and Company. Lithographic developer replenishment process. 4,025,344, Cl. 96-50.00A.

Allen, Joseph C., to Texaco Inc. Recovery of viscous oil by unheated air injection, followed by in situ combustion. 4,024,915, Cl. 166-256.000.

Allen, Robert F.: *See—*
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Allied Chemical Corporation: *See—*
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Anderson, Arlynn W.; Dester, Delbert D.; and Hanson, Edwin E., to Caterpillar Tractor Co. Hydrostatic mechanical transmission and controls therefor. 4,024,775, Cl. 74-687.000.

Anderson, Kenneth L.; and Kuper, Donald G., to Phillips Petroleum Company. Sequenced addition of components in poly(arylene sulfide) production. 4,025,496, Cl. 260-79.100.

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Andres, Karlheinz; Wagner, Kuno; Hoffmann, Erwin; and Kapps, Manfred, to Bayer Aktiengesellschaft. Process for the production of flame-resistant, hard polyurethane foams. 4,025,470, Cl. 260-2.5AJ.

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Nyman, Gustaf Arthur; and Savo, Gote, 4,025,356.

Antos, George J., to UOP Inc. Hydrocarbon conversion with an acidic sulfur-free multimetallic catalytic composite. 4,025,418, Cl. 208-139.000.

Antoshkiw, William T.; and Ursic, Thomas A., to Becton, Dickinson and Company. Balloon catheter assembly. 4,024,873, Cl. 128-349.00B.

Aoki, Tsutomu: *See—*
Nagata, Wataru; Okada, Kyo; Itazaki, Hiroshi; and Aoki, Tsutomu, 4,025,553.

Aragaki, Takahiko: *See—*
Sekikawa, Aisuke; and Aragaki, Takahiko, 4,024,941.

Arai, Kenichi: *See—*
Kurita, Takaji; Utsumi, Tetsuya; Ikeda, Hiroshi; Komura, Masaru; Miyata, Shin; Kawai, Yoshihisa; and Arai, Kenichi, 4,025,180.

Arai, Noboru: *See—*
Kido, Keishiro; and Arai, Noboru, 4,025,345.

Arai, Satoshi: *See—*
Kobayashi, Kazuo; Ohmori, Shiroh; Hasuda, Tetsuhiko; Shiraishi, Minoru; and Arai, Satoshi, 4,025,689.

Arase, Kazuhide: *See—*
Tanaka, Toshiharu; Tsuda, Naoteru; and Arase, Kazuhide, 4,025,879.

Arblaster, Dennis. Combination lock permanently installable by self-gripping mounting means. 4,024,741, Cl. 70-233.000.

Arcamone, Federico; Bargiotti, Alberto; Cassinelli, Giuseppe; and diMarco, Aurelio, to Societa' Farmaceutici Italia S.p.A. 4'-Epi-6'-hydroxyadriamycin and method of use. 4,025,623, Cl. 424-180.000.

Arendsen, David Lloyd: *See—*
Zaugg, Harold Elmer; and Arendsen, David Lloyd, 4,025,512.

Arenson, Simon Weil, to Food Research-Marketers, Inc. Preventing food products from adhering. 4,025,656, Cl. 426-92.000.

Arima, Sumitaro; Oda, Minoru; Miyashita, Kyoichi; and Takada, Mamoru, to Tohoku Electric Power Company, Inc.; and Mitsubishi Denki Kabushiki Kaisha. Radiometric analyzer. 4,025,788, Cl. 250-253.000.

Armaturenfabrik Hermann Voss: *See—*
Schmidt, Hans Joachim, 4,025,049.

Armour Pharmaceutical Company: *See—*
Rubino, Andrew M., 4,025,615.

Armstrong Cork Company: *See—*
Kauffman, William J., 4,025,469.

Arnold, Dieter, to Carl Schenck AG. Apparatus for the production of a fleece. 4,025,254, Cl. 425-81.000.

Arnold, John B.; Bowyer, John M.; Hegbar, Howard R.; and Shaefer, Archie B., to Goodyear Aerospace Corporation. Battery condition monitoring method and apparatus. 4,025,916, Cl. 340-249.000.

Asahi Glass Co., Ltd.: *See—*
Oda, Yoshio; Uchida, Keiichi; Suhara, Manabu; and Morimoto, Takeshi, 4,025,565.

Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
Tsuda, Nobuaki; Inagaki, Kenji; Imamiya, Tamotu; Ohno, Kunio; and Mizoguchi, Yoshiyuki, 4,025,436.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Sugiyama, Takahiro, 4,025,168.

Asano, Masahide: *See—*
Miki, Tosaku; Hosokawa, Yasuhiro; Miwa, Tamotsu; Fujita, Hiroshi; Asano, Masahide; and Aibara, Shunzo, 4,025,644.

Associated Universities, Inc.: *See—*
Predmore, Clayton Read, 4,025,878.

Ateliers des Charmilles S.A.: *See—*
Lieber, Jean, 4,025,228.

Atkinson, Lowell G., to General Aviation Electronics, Inc. Multi-channel R.F. transducer with channel selector coupled to selected channel filter. 4,025,855, Cl. 325-137.000.

Atomic Energy of Canada Limited: *See—*
Rolston, John H.; Stevens, William H.; Denhartog, James; and Butler, John P., 4,025,560.

Atwood, George E.: *See—*
Cook, Melvin S.; and Atwood, George E., 4,025,400.

Atwood & Morrill Co.: *See—*
Prescott, Norman F.; and Cook, Herbert, 4,024,884.

Audi NSU Auto Union Aktiengesellschaft: *See—*
Kossler, Albert, 4,025,358.

Ruf, Max; and Steinwart, Johannes, 4,025,366.
Auer, Peter, to Dyckerhoff & Widmann Aktiengesellschaft. Concrete tie forming system. 4,025,265, Cl. 425-211.000.
Auerbeck, Jiri: *See*—
Suesser, Vaclav; Vach, Josef; Ladr, Ivan; and Auerbeck, Jiri, 4,025,713.
Aultz, Daniel Eugene: *See*—
McFadden, Arthur Raymond; and Aultz, Daniel Eugene, 4,025,640.
Aumuller, Walter: *See*—
Weyer, Rudi; Aumuller, Walter; Hitzel, Volker; and Schmidt, Felix Helmut, 4,025,519.
Austin Powder Company: *See*—
Calder, Brooke J., Jr.; Belock, Robert J.; and Prescott, Roger N., 4,024,817.
Austin, Robert Roy: *See*—
Tyson, George Noblit; and Austin, Robert Roy, 4,024,991.
Automated Building Components, Inc.: *See*—
Jureit, John Calvin; Castillo, Adolfo; Leutwyler, Roy; Kushner, Benjamin H.; and Brodsky, Larry, 4,025,028.
Automatik Apparate-Maschinebau H. Hench GmbH: *See*—
Hunke, Friedrich, 4,025,252.
Avco Corporation: *See*—
Lucas, Joseph G., 4,025,361.
B. F. Goodrich Company, The: *See*—
Gilles, Jack Conrad, 4,025,486.
Minchak, Robert J.; and Beauregard, Robert E., 4,025,708.
Siebert, Alan R., 4,025,578.
Baba, Noboru: *See*—
Suwa, Masateru; and Baba, Noboru, 4,025,336.
Bachman, Charles W.; and Franklin, Benjamin S., to Honeywell Information Systems, Inc. Database instruction find owner. 4,025,901, Cl. 340-172.500.
Baganz, Horst; and May, Hans-Joachim, to A. Nattermann & Cie GmbH. Blood pressure lowering in human mammals. 4,025,639, Cl. 424-273.000.
Bahre, Karl; and Nowak, Hans-Dieter, to Klockner-Werke AG. Coal planer. 4,025,117, Cl. 299-34.000.
Bailey, A. Preston; and Sullivan, Lawrence J. High pressure burner with integral pilot. 4,025,292, Cl. 431-353.000.
Bailey, John V.; Cleveland, Thomas H.; and Wirfel, Emanuel W., to Mobay Chemical Corporation. Utilization of bisphenol-A from the alkaline phase generated in the production of polycarbonates. 4,025,489, Cl. 260-47.0XA.
Bailey, Rondell L.: *See*—
Craig, Walter J.; Lewis, Walter K.; and Bailey, Rondell L., 4,024,979.
Bailey, Thomas Albert, III: *See*—
Allen, Charles Anthony; Bailey, Thomas Albert, III; and Sinclus, Joseph Anthony, 4,025,344.
Bailey, Watson: *See*—
Knight, Edward P.; and Bailey, Watson, 4,024,826.
Bajars, Laimonis: *See*—
Croce, Louis J.; Bajars, Laimonis; and Gabliks, Maigonis, 4,025,461.
Baker, Ira R.: *See*—
Davies, Gomer L.; and Baker, Ira R., 4,024,864.
Baker, Wayne B. Cylinder lock for revolvers. 4,024,663, Cl. 42-67.000.
Balde-Werke Photographische Gerate & Kunststoff GmbH & Co.: *See*—
Lange, Karl Heinz, 4,025,936.
Balinov, Igor Mikhailovich; Samsonov, Georgy Nikiforovich; Balykov, Vladimir Mikhailovich; Paramonov, Vadim Ivanovich; and Demyashkin, Nikolai Mikhailovich. Feed system of a coal getting combine. 4,025,120, Cl. 299-43.000.
Ball Brothers Service Corporation: *See*—
Deane, David W., 4,025,201.
Deane, David W., 4,025,202.
Ball, Dennis C. Hand restraining device. 4,024,863, Cl. 128-133.000.
Ball, Harry; and Stauffer, James M., to Technical Fabricators, Inc. Rotary filter apparatus having slurry agitator. 4,025,437, Cl. 210-383.000.
Ballendux, Gerardus M., to Allis-Chalmers Corporation. Multiple bearing adjusting device. 4,025,136, Cl. 308-207.00A.
Ballendux, Gerardus M.: *See*—
Hoepfl, Joseph R.; and Ballendux, Gerardus M., 4,024,937.
Balykov, Vladimir Mikhailovich: *See*—
Balinov, Igor Mikhailovich; Samsonov, Georgy Nikiforovich; Balykov, Vladimir Mikhailovich; Paramonov, Vadim Ivanovich; and Demyashkin, Nikolai Mikhailovich, 4,025,120.
Bar, Vilmos; Mercz, Jeno; Szvoboda, Janos; Pollak, Zsuzsanna B.; and Matyas, Jakab, to Material Ksz. Dihydroquinoline derivatives of antioxidant activity. 4,025,631, Cl. 424-258.000.
Barber-Colman Company: *See*—
Grengg, Walter M.; and Weitzmann, Karl E., 4,025,808.
Barber, Everett M., to Texaco Inc. Process for the production of hydrogen. 4,025,612, Cl. 423-655.000.
Barford, John Cowper, to Griffin Products Incorporated. Helmet conversion kit safety helmet. 4,024,587, Cl. 2-424.000.
Bargiotti, Alberto: *See*—
Arcamone, Federico; Bargiotti, Alberto; Cassinelli, Giuseppe; and diMarco, Aurelio, 4,025,623.
Barkan, Philip; and Sharp, William Thomas, to General Electric Company. Electric circuit breaker with electro-magnetically-assisted closing means. 4,025,886, Cl. 335-195.000.
Barnes Drill Co.: *See*—
Greenberg, Donald K., 4,025,433.
Barr, Jack R.; Hrodey, Thomas E.; and Johnson, Ralph G., to Caterpillar Tractor Co. Push block assembly with shear load transmitting means. 4,025,086, Cl. 280-481.000.
Barrett, Stewart P., Jr.: *See*—
Hughes, W. Taliaferro; and Barrett, Stewart P., Jr., 4,025,822.
Barron, Eugene R., to Du Pont de Nemours, E. I., and Company. Product reinforcing fabric and two-component weft yarn useful therein. 4,024,895, Cl. 139-426.00R.
Bartel, Siegfried; and Hell, August, to AGFA-Gevaert, A.G. Apparatus for scanning a marked web. 4,025,025, Cl. 226-33.000.
BASF Aktiengesellschaft: *See*—
Fischer, Adolf; Hansen, Hanspeter; and Rohr, Wolfgang, 4,025,544.
Leutner, Bernd; and Diehl, Lothar, 4,025,352.
Miksovsky, Felix; and Fikentscher, Rolf, 4,025,503.
Bassett, James G., Jr.; and Gilbert, Saul, to United States Steel Corporation. Continuous casting method for the production of rolled low carbon steel products with improved formability. 4,024,624, Cl. 29-527.700.
Batchelor, John Frederick: *See*—
Hodson, Harold Francis; and Batchelor, John Frederick, 4,025,635.
Baum, Charles S. Method of forming metal tungsten carbide composites. 4,024,902, Cl. 164-97.000.
Baumann, Gerhard; and Wuchner, Xaver, to George Fisher Aktiengesellschaft. Pipe machining apparatus, particularly combination pipe threading and cutting machine. 4,025,219, Cl. 408-29.000.
Bausch & Lomb Incorporated: *See*—
Peck, Theodore H., 4,025,171.
Baxter Laboratories, Inc.: *See*—
Garcia, Luis A.; and Ordonez, Guido A., 4,025,500.
Baxter Travenol Laboratories, Inc.: *See*—
Garber, Jan W.; and Davisson, De Wayne G., 4,025,618.
Bayer Aktiengesellschaft: *See*—
Andres, Karlheinz; Wagner, Kuno; Hoffmann, Erwin; and Kappa, Manfred, 4,025,470.
Binsack, Rudolf; Bottenbruch, Ludwig; and Hespe, Hans, 4,025,492.
Corte, Herbert; Heller, Harold; Lange, Michael; and Netz, Otto, 4,025,705.
Eifler, Willi; and Knofel, Hartmut, 4,025,557.
Gruber, Hermann; Fehlbier, Alois; and Ruprecht, Hans-Dieter, 4,025,579.
BBC Brown Boveri & Company Limited: *See*—
Doriguzzi, Rino; and Scheffer, Terry J., 4,025,164.
La Roche, Ulrich, 4,025,161.
Beachler, Edward D.: *See*—
Daane, Robert A.; Beachler, Edward D.; Vonderau, Raymond C.; and Sokolow, Nickolas N., 4,025,294.
Bean, Ernest H.: *See*—
Kleysteuber, William K.; and Bean, Ernest H., 4,025,121.
Beasley, James D.: *See*—
Hou, Shou L.; Beasley, James D.; and Koneval, Donald J., 4,025,928.
Beatrice Foods Co.: *See*—
Neel, William E., 4,025,260.
Beauchamp, Lee R. Alarm system and remote monitor panel. 4,025,918, Cl. 340-409.000.
Beauregard, Robert E.: *See*—
Minchak, Robert J.; and Beauregard, Robert E., 4,025,708.
Beauvais, Thierry; and Carre, Roland, to Thomson-CSF. Correlator device. 4,025,775, Cl. 235-181.000.
Beckenbach, Karl. Process and apparatus for firing and sintering of granular material. 4,025,293, Cl. 432-5.000.
Becker, Willi, to Heidelberger Druckmaschinen Aktiengesellschaft. Transfer drum in sheet-fed rotary printing presses. 4,024,814, Cl. 101-410.000.
Becker, Willi. Vessel rudder assembly, particularly a balance type profile rudder with a fin. 4,024,827, Cl. 114-162.000.
Beckers, Hans, to Robert Bosch G.m.b.H. Apparatus for stamping candy bits. 4,025,270, Cl. 425-297.000.
Beckman Instruments, Inc.: *See*—
Kampf, Richard S., 4,024,767.
Smith, Leland Bryan, 4,025,869.
Watts, Geoffrey Phillip, 4,025,816.
Becton, Dickinson and Company: *See*—
Antoshkiw, William T.; and Ursic, Thomas A., 4,024,873.
Blecher, Jacob B.; Tabor, Gene W.; Steinbrink, Charles F., Jr.; and Wand, Bruce H., 4,024,857.
Beguin, Jean-Luc: *See*—
Portmann, Hubert; Droz, Willy; and Beguin, Jean-Luc, 4,024,678.
Behrendt, Wilhelm A.; and Stieh, Bernhard, to Temmler A.G., Firma. $\alpha,\alpha$-Diaryl-$\beta$-(tert-amino)-propanols and pharmaceutical compositions containing them. 4,025,633, Cl. 424-267.000.
Behringer, Donald F.: *See*—
Rossi, Anthony J.; and Behringer, Donald F., 4,025,762.
Beitzinger, Kurt: *See*—
Goldammer, Georg; and Beitzinger, Kurt, 4,024,699.
Belke Manufacturing Company, Inc.: *See*—
Belke, Ralph E., 4,025,677.
Belke, Ralph E., to Belke Manufacturing Company, Inc. Temporary patch for a crack in the wall of a container. 4,025,677, Cl. 428-63.000.

Bell & Howell Company: *See—*
Miller, James A., 4,025,900.

Bell, Richard L.; and DeSimone, David N., to United States of America, Navy. Integrated cooling and breathing system. 4,024,730, Cl. 62-259.000.

Bell Telephone Laboratories, Incorporated: *See—*
Addeo, Eric John, 4,025,853.
Bobeck, Andrew Henry; and Kowalchuk, Roman, 4,025,911.
Brewer, Sherman Theodore, 4,025,737.
Ching, Yau-Chau, 4,025,852.
Gloge, Detlef Christoph; Kaminow, Ivan Paul; and Presby, Herman Melvin, 4,025,156.
Judd, James Hewitt; and Manganello, Joseph Charles, 4,025,888.
Schneider, Herbert Anton, 4,025,735.
Seidel, Harold, 4,025,867.
Stone, Dale Eugene, 4,025,729.

Belock, Robert J.: *See—*
Calder, Brooke J., Jr.; Belock, Robert J.; and Prescott, Roger N., 4,024,817.

Beloit Corporation: *See—*
Daane, Robert A.; Beachler, Edward D.; Vonderau, Raymond C.; and Sokolow, Nickolas N., 4,025,294.

Belyaev, Nikolai Semenovich: *See—*
Chelnokov, Gennady Ivanovich; Ruvinsky, Leonid Gershevich; Kovalenko, Igor Leonidovich; Sokolov, Ivan Ivanovich; Belyaev, Nikolai Semenovich; Okhotsky, Vladimir Pavlovich; and Belyshev, Leonid Lavrentievich, 4,024,860.

Belyshev, Leonid Lavrentievich: *See—*
Chelnokov, Gennady Ivanovich; Ruvinsky, Leonid Gershevich; Kovalenko, Igor Leonidovich; Sokolov, Ivan Ivanovich; Belyaev, Nikolai Semenovich; Okhotsky, Vladimir Pavlovich; and Belyshev, Leonid Lavrentievich, 4,024,860.

Bender, Charles E. Safety flask for freeze drying. 4,024,648, Cl. 34-92.000.

Bendix Corporation, The: *See—*
Thompson, Robert H., 4,025,197.

Bendo Kogyo Co., Ltd.: *See—*
Yashiro, Kazuyoshi, 4,024,748.

Bennes Marrel: *See—*
Guillot, Jack, 4,024,905.

Bennet, Geoffrey Robert, to Heating Elements Limited. Yarn heaters. 4,025,753, Cl. 219-388.000.

Bennett, Walter Scott, to Burroughs Corporation. Enhanced apparatus for binary quotient, binary product, binary sum and binary difference generation. 4,025,773, Cl. 235-164.000.

Benoit-Guyod, Jean-Louis Alain: *See—*
Taillandier, Georges Marcel; Benoit-Guyod, Jean-Louis Alain; Boucherle, Andre Louis; Eymard, Pierre Luc; Broll, Madeleine; and Ferrandes, Bernard, 4,025,649.

Bentley, William Ferrel: *See—*
Luedtke, Arthur; and Bentley, William Ferrel, 4,025,924.

Beretta, Paolo; and Valbusa, Luigi, to Minnesota Mining and Manufacturing Company. Togged direct-positive silver halide emulsion containing a cyanine dye having an indole or indolenine nucleus substituted with a benzoyl or a phenylsulfonyl group. 4,025,347, Cl. 96-101.000.

Berg, Bengt Artur: *See—*
Hellstrom, Nils-Erik; and Berg, Bengt Artur, 4,024,964.

Berg, George R., to Acme-Lite Manufacturing Co. Multiple adapter plug for instamatic-type cameras. 4,025,933, Cl. 354-141.000.

Bergersen, Hans Amund, to Patentkonsortiet Robert Meinich & Co. Continuous web consisting of resistance foil material between two insulating foil layers and method for the production of such webs. 4,025,893, Cl. 338-212.000.

Berges, David A., to SmithKline Corporation. 7-Acyl-3-(ureidoalkyl substituted tetrazolylthiomethyl)-cephalosporins. 4,025,626, Cl. 424-246.000.

Bergler, Otto; and Lutz, Eugen, to Eugene Lutz KG Maschinenfabrik Lomersheim. Angular guide for manual routing milling machines. 4,024,898, Cl. 144-134.00D.

Bergmann, Ewald; and Pfisterer, Horst, to L. Schuler GmbH. Apparatus for conveying punched-out components. 4,024,747, Cl. 72-325.000.

Bergquist, Dwight H.; and Lorimor, Gary D., to Henningsen Foods, Inc. Removable sanitary hanger bearing. 4,025,131, Cl. 308-27.000.

Bernardo, Edward Thomas, to International Business Machines Corporation. Variable resist laminator. 4,025,380, Cl. 156-355.000.

Berol Kemi AB: *See—*
Wahlen, Svante Ludvig, 4,025,353.

Berry, Robert L.; and Dehne, Axel G., to Hughes Aircraft Company. Vuilleumier refrigerator with separate pneumatically operated cold displacer. 4,024,727, Cl. 62-6.000.

Bert, Alain, to Thomson-CSF. Piezoelectric device for image readout. 4,025,954, Cl. 358-213.000.

Bethlehem Steel Corporation: *See—*
Shipman, Johnson; and Gilles, Herbert L., 4,024,764.

Betz Laboratories, Inc.: *See—*
Potrzebowski, Anthony C., 4,024,751.

Beyer, Detlef; Linnet, Anton Pedersen; and Thomsen, Gerhard, to Leo Pharmaceutical Products Ltd., A/S. Treatment of canine otitis and composition therefor. 4,025,620, Cl. 424-115.000.

Bhartecy, Brij M.; and Rowe, Neal E., to Westinghouse Electric Corporation. Circuit interrupter stab assembly with self-aligning clip type contact. 4,025,747, Cl. 200-254.000.

Bharteey, Brij M.: *See—*
Wilson, John R.; Bharteey, Brij M.; and Shariff, Sadiq A., 4,025,826.

Bicc Limited: *See—*
Parr, David Turner, 4,025,600.

Bickel, Hans; and Mueller, Johannes, to Ciba-Geigy Corporation. Aminopyridinium acetyl cephalosporanes. 4,025,509, Cl. 260-243.00C.

Bielomatik Leuze & Co.: *See—*
Pecha, Ernst, 4,025,371.

Bielstein, Georg Paul Richard: *See—*
Nightingale, Colin Walter; and Bielstein, Georg Paul Richard, 4,025,413.

Bilgen, Ertugrul: *See—*
Akgungor, Ali Caglar; and Bilgen, Ertugrul, 4,024,883.

Binsack, Rudolf; Bottenbruch, Ludwig; and Hespe, Hans, to Bayer Aktiengesellschaft. Thermoplastic copolyesters and a process for their production. 4,025,492, Cl. 260-75.00R.

Bintz, Donald H., to Raymond Lee Organization, Inc., The, a part interest. Vehicle towing support structure. 4,025,081, Cl. 280-7.140.

Biocommunications Research Corporation: *See—*
Graupe, Daniel; and Causey, G. Donald, 4,025,721.

Bisel, Roberto: *See—*
Modena, Mario; and Bisel, Roberto, 4,025,468.

Bixler, Kenneth D.: *See—*
Reifers, Richard F.; Bixler, Kenneth D.; and Lord, Henry A., 4,025,038.

Black, Dewey W.: *See—*
Weiland, Henry J.; and Black, Dewey W., 4,024,881.

Black, Robert B., to Black, Robert B. Energy conversion system. 4,025,291, Cl. 431-346.000.

Blackledge, Vernon O., to Hearing Health Group, Inc. Real time amplitude control of electrical waves. 4,025,723, Cl. 179-1.0VL.

Blacksher, Roy: *See—*
Kaufman, Phillip A.; Gorman, Kenneth C.; Henry, George C.; and Blacksher, Roy, 4,025,903.

Blaise, Jean; and Grimaud, Edouard, to Produits Chimiques Ugine Kuhlmann. Process for the polymerization of vinylidene fluoride. 4,025,709, Cl. 526-225.000.

Blanc, Jean-Henri: *See—*
Pornin, Rene; Blanc, Jean-Henri; and Voirin, Robert, 4,025,703.

Blasnik, William, to Lafayette Brass Company Inc. Spray nozzle. 4,025,000, Cl. 239-459.000.

Blatt, Peter R.: *See—*
Shaw, John B.; Blatt, Peter R.; and Geswein, Francis I., 4,025,793.

Blecher, Jacob B.; Tabor, Gene W.; Steinbrink, Charles F., Jr.; and Wand, Bruce H., to Becton, Dickinson and Company. Micro blood collection device. 4,024,857, Cl. 128-2.00F.

Blevins, Dennis R.: *See—*
Quick, Kenneth L.; and Blevins, Dennis R., 4,025,7 4.

Block, Alvin W. Can construction device and system. 4,025,212, Cl. 403-361.000.

Block Engineering, Inc.: *See—*
Hirschfeld, Tomas, 4,025,393.

Blue Bell, Inc.: *See—*
Knight, Edward P.; and Bailey, Watson, 4,024,826.

Blyweert, Pierre J., to Lera Holding S.A. Prefabricated structure for erecting a building. 4,024,680, Cl. 52-18.000.

Bobeck, Andrew Henry; and Kowalchuk, Roman, to Bell Telephone Laboratories, Incorporated. Magnetic bubble memory bias magnet arrangement. 4,025,911, Cl. 340-174.0TF.

Bochinski, Julius H. Programmed fluid sampling and analysis apparatus. 4,025,311, Cl. 23-253.00R.

Boda, Robert A. Tripod cooking device. 4,024,851, Cl. 126-30.000.

Boehringer Ingelheim GmbH: *See—*
Koppe, Herbert; Stahle, Helmut; Kummer, Werner; and Traunecker, Werner, 4,025,646.
Stahle, Helmut; Koppe, Herbert; Kummer, Werner; Stockhaus, Klaus; Hoefke, Wolfgang; and Kuhn, Franz Josef, 4,025,607.

Boeing Company, The: *See—*
Donnelly, Dennis J.; Marceau, Joseph Arthur; McMillan, Joseph Corey; and Moji, Yukimori, 4,025,681.
Pond, C. Ray; Robinson, Lawrence W.; and Texeira, Patrick D., 4,025,193.

Boer, F. Peter: *See—*
Steiner, Edwin C.; Newton, Robert A.; and Boer, F. Peter, 4,025,523.

Boller, George E.: *See—*
Renk, Richard J.; and Boller, George E., 4,025,079.

Bollinger, Howard E.: *See—*
Murdock, Marshall B.; and Bollinger, Howard E., 4,025,215.

Bolton-Emerson, Inc.: *See—*
Mladota, John, 4,025,434.
Park, George C.; and Porter, Arthur B., 4,024,854.

Bolz, Gunner; Deindoerfer, Fred H.; Gifford, Charles R.; and Kameda, Naomi, to International Diagnostic Technology, Inc. Method for reading a wet fluorescent surface. 4,025,310, Cl. 23-230.00B.

Bonnet, Ludwig, to Richard Wolf GmbH. Resectoscopes. 4,024,869, Cl. 128-303.150.

Booth, Eugene E.: *See—*
Smith, Jonathan; Larko, Robert C.; and Booth, Eugene E., 4,025,297.

Borden, George W.; Smith, Oliver W.; and Trecker, David J., to Union Carbide Corporation. Acrylated epoxidized soybean oil urethane derivatives. 4,025,477, Cl. 260-23.0EP.

Borden, Inc.: *See—*
Petke, Frederick Edward; Kirch, John Nicholas; and Gerkin, Michael Edward, 4,025,346.
Boris, Michel, to Societe Technique de Pulverisation. Liquid atomisers. 4,025,046, Cl. 239-333.000.
Bosley, David E.; and Duncan, Patrick J., to Du Pont de Nemours, E. I., and Company. Addition of diethylene glycol in continuous production of polyester yarn. 4,025,592, Cl. 264-78.000.
Botalam: *See—*
Glasson, Jean Emile, 4,024,805.
Botsolas, Christos John; and Kostecki, Ronald, to Johns-Manville Corporation. Curvable fibrous thermal insulation. 4,025,680, Cl. 428-113.000.
Bottard, Gilles Jean Marcel, to Compagnie Honeywell Bull (Societe Anonyme). Testing system for a data processing unit. 4,025,767, Cl. 235-153.0AC.
Bottenbruch, Ludwig: *See—*
Binsack, Rudolf; Bottenbruch, Ludwig; and Hespe, Hans, 4,025,492.
Boucherle, Andre Louis: *See—*
Taillandier, Georges Marcel; Benoit-Guyod, Jean-Louis Alain; Boucherle, Andre Louis; Eymard, Pierre Luc; Broll, Madeleine; and Ferrandes, Bernard, 4,025,649.
Bouley, Jean-Claude, to Bunker Ramo Corporation. Socket for blade-type electrical contacts. 4,025,148, Cl. 339-176.0MP.
Bourgery, Guy R.: *See—*
Fauran, Claude P.; Bourgery, Guy R.; Raynaud, Guy M.; and Gouret, Claude J., 4,025,514.
Bourns, Inc.: *See—*
Erwin, Carl Lloyd; Howett, Michael John; and Nojiri, Howard Hideo, 4,025,738.
Bowyer, John M.: *See—*
Arnold, John B.; Bowyer, John M.; Hegbar, Howard R.; and Shaefer, Archie B., 4,025,916.
Boyd, William Hunter A.: *See—*
Rabinow, Jacob; and Boyd, William Hunter A., 4,024,998.
Bramley, Hugh Christopher, to Caterpillar Tractor Co. Rotary regenerative heat exchanger. 4,024,906, Cl. 165-9.000.
Brandt, James Chester. Method of producing a translucent panel. 4,025,663, Cl. 427-161.000.
Branscum, Tony E., to Gott Mfg. Co., Inc. Insulated container with refreezable lid-mounted bottle. 4,024,731, Cl. 62-457.000.
Braun Aktiengesellschaft: *See—*
Anders, Klaus; and Faatz, Heinz-Werner, 4,025,223.
Braun, Oskar. Liquid settling and press container. 4,024,810, Cl. 100-116.000.
Brearley, Malcolm, to Girling Limited. Brake pressure failure circuit for multi-line brake systems. 4,025,781, Cl. 340-52.00C.
Brewer, Robert A. Function-separating connector. 4,024,608, Cl. 24-236.000.
Brewer, Sherman Theodore, to Bell Telephone Laboratories, Incorporated. Repeater monitoring and fault location. 4,025,737, Cl. 179-175.31R.
Brickman, Norman Frederick; and Logue, Joseph Carl, to International Business Machines Corporation. Simplified dynamic associative cell. 4,025,909, Cl. 340-173.0FF.
Brickner, Sheldon: *See—*
Rosenberg, Melvin; and Brickner, Sheldon, 4,024,607.
Bricot, Claude: *See—*
Lehureau, Jean-Claude; and Bricot, Claude, 4,025,784.
Bridgehouse, Scott, to Lift-All Company, Inc. Synthetic fiber sling construction. 4,025,100, Cl. 294-74.000.
Bridger, Robert F.: *See—*
Cier, Ronald J.; and Bridger, Robert F., 4,025,446.
Bridgestone Tire Company Limited: *See—*
Shiozaki, Tadao; and Meguro, Daitetsu, 4,025,384.
Bridgewater, Thomas Austin St. Clair, to RCA Corporation. Color function display system. 4,025,945, Cl. 358-1.000.
Briggs, Allan D.: *See—*
Adawi, Marwan K.; Briggs, Allan D.; DeLosh, Robert G.; and Smith, Carol S., 4,024,706.
Bright Star Industries, Inc.: *See—*
Oswald, Anton H., 4,025,743.
Brilli, Fosco. Method for forming inserts in shoe soles and the product obtained. 4,024,652, Cl. 36-14.000.
Brissey, George Edward; and Richter, Eike, to General Electric Company. Permanent magnet generator with output power adjustment by means of magnetic shims. 4,025,840, Cl. 322-52.000.
British Copper Refiners Limited: *See—*
Nightingale, Colin Walter; and Bielstein, Georg Paul Richard, 4,025,413.
British Nuclear Fuels Limited: *See—*
Jackson, Fred, 4,025,388.
Broadbent, Kenneth Joseph. Rock bolting equipment. 4,024,923, Cl. 173-57.000.
Brock, Herbert B., to Rohm and Haas Company. Strong anion exchange resins free of active chloride and method of preparation. 4,025,467, Cl. 260-2.10E.
Brodsky, Larry: *See—*
Jureit, John Calvin; Castillo, Adolfo; Leutwyler, Roy; Kushner, Benjamin H.; and Brodsky, Larry, 4,025,028.
Brody, Thomas P.: *See—*
Reitboeck, Heribert J. P.; and Brody, Thomas P., 4,025,920.
Broll, Madeleine: *See—*
Taillandier, Georges Marcel; Benoit-Guyod, Jean-Louis Alain; Boucherle, Andre Louis; Eymard, Pierre Luc; Broll, Madeleine; and Ferrandes, Bernard, 4,025,649.
Brookner, Eli; and Leach, Wilfred F., to United States of America, Army. Technique for obtaining wide bandwidth with optically fed array. 4,025,921, Cl. 343-5.00R.
Brothers, Alvin O. Ladder attachments. 4,025,016, Cl. 248-210.000.
Brown, James. Linkage bridge. 4,024,595, Cl. 14-1.000.
Brown, Joe R. Equipment handling apparatus. 4,024,925, Cl. 175-85.000.
Brown, Omar L., to Fraze, Ermal C. Easy-open ecology end. 4,024,981, Cl. 220-269.000.
Brown, Stephen V., to GTE Sylvania Incorporated. Photoflash lamp. 4,025,285, Cl. 431-95.00R.
Browning, William W.; and Legacy, Donald J., to Turbodyne Corporation (Steam Turbine Div.). Diaphragm with cast nozzle blocks and method of construction thereof. 4,025,229, Cl. 415-216.000.
Broyhill Industries: *See—*
Murdock, Marshall B.; and Bollinger, Howard E., 4,025,215.
Bruck, Josef, to Demag Aktiengesellschaft. Stand gearing arrangement for the rolls of a continuous rolling mill. 4,024,746, Cl. 72-249.000.
Brunmayer-Schilt, Willy: *See—*
Verbrugge, Pieter A.; and Brunmayer-Schilt, Willy, 4,025,562.
Bryant, Frank Allan: *See—*
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Bryla, Theodore N.: *See—*
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Brzytwa, Tadek, to Air Preheater Company, Inc., The. Sealing plate support. 4,024,907, Cl. 165-9.000.
Bucalo, Louis. Magnetic filamentary structure and method for using the same. 4,024,855, Cl. 128-1.00R.
Bucher, Erich; and Scheutle, Erich, to Zinser Textilmaschinen GmbH. False twisting machine. 4,024,697, Cl. 57-34.0HS.
Buchner, Heinrich, to Klockner-Humboldt-Deutz Aktiengesellschaft. Device for thermically treating granular and/or lumpy materials. 4,025,296, Cl. 432-58.000.
Bulldog Toy Company Limited: *See—*
Kyte, Eric, 4,025,106.
Bunker Ramo Corporation: *See—*
Bouley, Jean-Claude, 4,025,148.
Burness, Donald MacArthur: *See—*
Maggiulli, Cataldo Aldino; Burness, Donald MacArthur; and Perkins, William Clarence, 4,025,542.
Burri, Kaspar F.; Kienzle, Frank; and Rosen, Perry, to Hoffmann-La Roche Inc. 1-Acetyl-3(4)-(dihydrocarbylphosphoryloxy)-cyclohex-3-enes. 4,025,584, Cl. 260-946.000.
Burroughs Corporation: *See—*
Bennett, Walter Scott, 4,025,773.
Karp, Joel Allen; and Reed, John Anthony, 4,025,907.
Missios, Michael Herodotus; and Werner, John Richard, 4,025,768.
Morse, Robert S., 4,025,716.
Smith, Douglas A., 4,025,859.
Burroughs Wellcome Co.: *See—*
Hodson, Harold Francis; and Batchelor, John Frederick, 4,025,635.
Buss, Russell A.; and Linsley, Jerald N., to Phillips Petroleum Company. Vessel residence time control. 4,025,498, Cl. 260-95.00A.
Butler, John P.: *See—*
Rolston, John H.; Stevens, William H.; Denhartog, James; and Butler, John P., 4,025,560.
Butoi, Aristotel. Energy system for self-propelled vehicles. 4,024,926, Cl. 180-65.00D.
Buxton, Samuel R.: *See—*
Campbell, David O.; and Buxton, Samuel R., 4,025,602.
Buzzi, Gian Fausto: *See—*
Ferlazzo, Natale; Buzzi, Gian Fausto; Ghirga, Marcello; and Calcagno, Benedetto, 4,025,549.
B.V. Schroefboutenfabriek v.h.Everts en van der Weijden: *See—*
Goderbauer, Lodewijk, 4,025,044.
Byerley, Leon Geddis, III: *See—*
Winn, William Paul; and Byerley, Leon Geddis, III, 4,025,913.
Bynoe, Robert J., to Tremco Incorporated. Flashing system. 4,024,681, Cl. 52-60.000.
Byrd, George W.: *See—*
Ward, Carter J.; Huang, Kwang-Ta; and Byrd, George W., 4,024,823.
C. Reichert Optische Werke: *See—*
Taugner, Roland; and Eschwey, Juergen, 4,024,779.
C. Sherman Johnson Company, Inc.: *See—*
Johnson, Curtiss S., Jr., 4,025,207.
Calcagno, Benedetto: *See—*
Ferlazzo, Natale; Buzzi, Gian Fausto; Ghirga, Marcello; and Calcagno, Benedetto, 4,025,549.
Calder, Brooke J., Jr.; Belock, Robert J.; and Prescott, Roger N., to Austin Powder Company. Elongated flexible detonating device. 4,024,817, Cl. 102-27.00R.
Calini, Anthony J. Concrete reinforcing bar extension construction and method. 4,024,688, Cl. 52-378.000.
Camco, Incorporated: *See—*
Logan, Francis D.; and Dybala, Leonard M., 4,025,218.
Cameli, Nazzareno: *See—*
Natta, Giulio; Valvassori, Alberto; Sartori, Guido; and Cameli, Nazzareno, 4,025,497.

Camp, Albert T.: *See*—
Csanady, Elmer R.; Mosher, Paul R.; and Camp, Albert T., 4,025,370.
Camp, Stafford V., III, to Southampton Manufacturing Company, Inc. Apparatus for continuously manufacturing boards. 4,025,272, Cl. 425-324.00R.
Campbell, David O.; and Buxton, Samuel R., to United States of America, Energy Research and Development Administration. Recovery of transplutonium elements from nuclear reactor waste. 4,025,602, Cl. 423-7.000.
Canadian General Electric Company Limited: *See*—
Akgungor, Ali Caglar; and Bilgen, Ertugrul, 4,024,883.
Canadian Patents and Development Limited: *See*—
Chamberlain, Savvas G.; and Harper, David H., 4,025,943.
Felstead, E. Barry, 4,025,166.
Canon Kabushiki Kaisha: *See*—
Ando, Yujiro, 4,025,789.
Kawamura, Naoto, 4,025,170.
Matsumoto, Masakazu; Nishide, Katsuhiko; Shimosawa, Akemi; and Kinjo, Kikuo, deceased, 4,025,399.
Taguchi, Tetsuya; Yazaki, Mutsunobu; and Sanada, Noriaki, 4,025,931.
Cantarutti, Armindo, to NRM Corporation. Vulcanizer lock means. 4,025,251, Cl. 425-31.000.
Canty, Edgar P.: *See*—
Wright, William Warren; Rowell, John J.; and Canty, Edgar P., 4,025,884.
Carasso, Marino Giuseppo: *See*—
Schampers, Paulus Philippus Maria; Carasso, Marino Giuseppo; and Hoeberechts, Arthur Marie Eugene, 4,025,814.
Carl Schenck AG: *See*—
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Carl Zeiss-Stiftung: *See*—
Fischer, Helmut; Glatzel, Erhard; Jahn, Walter; and Zajadatz, Heinz, 4,025,169.
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Carncross, Clayton J.: *See*—
Horn, Lawrence A.; and Carncross, Clayton J., 4,025,284.
Carosella, John Henry: *See*—
Hayosh, Thomas David; and Carosella, John Henry, 4,025,761.
Carre, Roland: *See*—
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Carrier Corporation: *See*—
Leonard, Louis H., Jr., 4,025,326.
Richardson, Hubert, Jr.; and Carter, Thomas W., 4,025,239.
Streifert, Keith L., 4,025,130.
Carter, Robert Albert, to Xerox Corporation. Temperature compensated doctor blade. 4,024,834, Cl. 118-7.000.
Carter, Thomas W.: *See*—
Richardson, Hubert, Jr.; and Carter, Thomas W., 4,025,239.
Carver, Stephen Dee. Variable stiffness fishing rod. 4,024,666, Cl. 43-18.00R.
Casey, Susan D. Method and apparatus for generating graphic designs. 4,025,946, Cl. 358-81.000.
Cass, Ralph Sherwill, to Ferranti-Packard Limited. Coded label and decoding means and method. 4,025,442, Cl. 250-568.000.
Cassidy, Bruce P., to American Brands, Inc. Method and apparatus for detecting leaks. 4,024,956, Cl. 209-73.000.
Cassinelli, Giuseppe: *See*—
Arcamone, Federico; Bargiotti, Alberto; Cassinelli, Giuseppe; and diMarco, Aurelio, 4,025,623.
Castillero, Alphonso W., to Xerox Corporation. Printed circuit board plating process. 4,024,631, Cl. 29-625.000.
Castillo, Adolfo: *See*—
Jureit, John Calvin; Castillo, Adolfo; Leutwyler, Roy; Kushner, Benjamin H.; and Brodsky, Larry, 4,025,028.
Caterpillar Tractor Co.: *See*—
Anderson, Arlynn W.; Dester, Delbert D.; and Hanson, Edwin E., 4,024,775.
Barr, Jack R.; Hrodey, Thomas E.; and Johnson, Ralph G., 4,025,086.
Bramley, Hugh Christopher, 4,024,906.
Crabb, Elmer R., 4,024,936.
Goloff, Alexander, 4,025,245.
Hodge, Norman J., 4,024,974.
Johnson, Howard L., 4,024,797.
Leighty, Conard E.; and Vaughn, Kennith E., 4,025,108.
Mitchell, Thomas L., 4,025,094.
Schexnayder, Lawrence F.; and Peterson, Wayne A., 4,024,798.
Stinson, Robert A., 4,024,776.
Theobald, Michael R., 4,024,796.
Causey, G. Donald: *See*—
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Cave, David N., to UOP Inc. Vehicle seat cushion mounting arrangement. 4,025,114, Cl. 297-452.000.
Cawood, Charles David; and Mosior, Donald J., to American Hospital Supply Corporation. Door closure for fiber optic light source. 4,025,776, Cl. 240-1.0LP.
Celanese Corporation: *See*—
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Ceskoslovenska akademie ved: *See*—
Marek, Miroslav; Toman, Ludek; and Pecka, Jan, 4,025,402.
Marek, Miroslav; Toman, Ludek; and Pecka, Jan, 4,025,403.
Chamberlain, Savvas G.; and Harper, David H., to Canadian Patents and Development Limited. Photogeneration channel in front illuminated solid state silicon imaging devices. 4,025,943, Cl. 357-30.000.
Chambers, Derek; and Pedersen, Robert O., to Raytheon Company. Current limiting circuit for voltage regulated power supply. 4,025,841, Cl. 323-9.000.
Champion International Corporation: *See*—
O'Neil, Fred; O'Neil, Louise; and Ward, Paul S., 4,025,032.
Chan, David M. F.; and Chan, Michael L. F. Modular decorative structure. 4,025,012, Cl. 248-163.000.
Chan, Michael L. F.: *See*—
Chan, David M. F.; and Chan, Michael L. F., 4,025,012.
Chang, Clarence D.; and Lang, William H., to Mobil Oil Corporation. Process for manufacturing olefins. 4,025,575, Cl. 260-682.000.
Chang, Clarence D.; and Lang, William H., to Mobil Oil Corporation. Process for manufacturing olefins. 4,025,576, Cl. 260-682.000.
Chang, Wen-Hsuan; and Wismer, Marco, to PPG Industries, Inc. Method for preparing high solids films employing a plurality of curing mechanisms. 4,025,407, Cl. 204-159.140.
Chapman, Darrell F.: *See*—
McDiarmid, John C.; and Chapman, Darrell F., 4,024,668.
Charles O. Larson Co.: *See*—
Larson, Charles O., 4,025,014.
Cheatham, Harry P. Transformer support rack. 4,025,824, Cl. 361-332.000.
Cheek, Edward E.; and Tuli, Kuljit S., to McDowell-Wellman Engineering Company, The. Car dumper scale. 4,024,962, Cl. 214-2.000.
Chelnokov, Gennady Ivanovich; Ruvinsky, Leonid Gershevich; Kovalenko, Igor Leonidovich; Sokolov, Ivan Ivanovich; Belyaev, Nikolai Semenovich; Okhotsky, Vladimir Pavlovich; and Belyshev, Leonid Lavrentievich. Apparatus for drawing together and fixing the pelvic halves in pubic symphysis ruptures. 4,024,860, Cl. 128-84.00R.
Chemetron Corporation: *See*—
Yarem, Joseph; and Poss, Werner, 4,025,001.
Chemie Linz Aktiengesellschaft: *See*—
Obendorf, Werner; Lindner, Irmgard; Schwarzinger, Ernst; and Krieger, Josef, 4,025,550.
Chemigfaser Lenzing Aktiengesellschaft: *See*—
Sassahofer, Franz; Gotschy, Friedrich; Krassig, Johannes; and Wimmer, Adalbert, 4,025,598.
Cheney, Richard Frank; Lafferty, William Daniel; and Long, George Jacob, to GTE Sylvania Incorporated. Tungsten carbide-cobalt flame spray powder and method. 4,025,334, Cl. 75-.5OR.
Cheng, Hsiung; and Huebner, William S., to A. E. Staley Manufacturing Company. Extruded starch product for tapioca-style pudding. 4,025,657, Cl. 426-579.000.
Chesluk, Ralph P.: *See*—
Mead, Theodore C.; McDill, Richard T.; Chesluk, Ralph P.; and Odell, Norman R., 4,025,583.
Chevron Research Company: *See*—
Freenor, Francis J., III, 4,025,585.
Meader, Arthur L., Jr.; and Runyon, William L., Jr., 4,025,683.
Chi, Hui-Neng. Stapling machine. 4,025,031, Cl. 227-132.000.
Chikama, Toshio, to Machida Endoscope Co., Ltd. Endoscope. 4,024,858, Cl. 128-4.000.
Chilluffo, Ronald L., to United States of America, Navy. Broadband, microwave, two-stage, stagger-tuned, field effect transistor amplifier. 4,025,873, Cl. 330-35.000.
Ching, Yau-Chau, to Bell Telephone Laboratories, Incorporated. Method and arrangement for controlling delta modulator idle-channel noise. 4,025,852, Cl. 325-38.00B.
Chippa, Charles. Collapsible spoon-bottom chair. 4,025,107, Cl. 297-17.000.
Chlupsa, John Rudolph Matthew, to RFL Industries, Inc. Apparatus for measuring the value of a variable condition. 4,025,736, Cl. 179-175.30F.
Cho, Iue Chung; and Kolar, Charles W., Jr., to Ralston Purina Company. Soy protein/casein coffee whitener composition. 4,025,659, Cl. 426-613.000.
Choate, Paul V.: *See*—
Weeks, Charles B.; and Choate, Paul V., 4,024,806.
Christy, Charles Albert. Engine and compressor arrangement. 4,024,840, Cl. 123-8.410.
Chudner, Joseph. Instrument for drawing geometric figures. 4,024,641, Cl. 33-30.00B.
Chupp, Vernon L.; and Duffield, Jack J., to Varian Associates. Asymmetric double pass grating monochromator. 4,025,196, Cl. 356-101.000.
Ciba-Geigy AG: *See*—
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Ciba-Geigy Corporation: *See*—
Bickel, Hans; and Mueller, Johannes, 4,025,509.
Dexter, Martin; and Knell, Martin, 4,025,487.
Garner, Robert; and Petitpierre, Jean-Claude, 4,025,089.
Gschwend, Heinz Werner; and Hillman, Malvin Jason, 4,025,505.
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Neuschutz, Heinz, 4,025,429.
Petitpierre, Jean-Claude, 4,025,090.
Tournayre, Jean Claude; and Vogel, Christian, 4,025,554.
Wegmuller, Hans; and Haase, Jaroslav, 4,025,428.
Cieciuch, Ronald F. W.; and Schlein, Herbert N., to Polaroid Corporation. Photographic products. 4,025,682, Cl. 428-480.000.
Cier, Ronald J.; and Bridger, Robert F., to Mobil Oil Corporation. Lubricant compositions containing nitrile antiwear additives. 4,025,446, Cl. 252-51.50R.
Citizen Watch Co., Ltd.: *See*—
Nishimura, Hajime; and Nomura, Yasushi, 4,025,702.
Claffey, Walter W.: *See*—
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Clark Equipment Company: *See—*
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Clayton Manufacturing Company: *See—*
Cline, Edwin Lee, 4,024,756.
Cleer, Clarence W., Jr., to Ridgway Steel Fabricators, Inc. Fireplace heating system. 4,025,043, Cl. 237-53.000.
Clemens, Anton Hubert, to Miles Laboratories, Inc. Peristaltic pump with tube pinching members capable of biasing the tubing away from the pump rollers. 4,025,241, Cl. 417-477.000.
Cleveland, Joseph J., to GTE Sylvania Incorporated. Ceramic cellular structure having high cell density and catalyst layer. 4,025,462, Cl. 252-477.00R.
Cleveland, Thomas H.: *See—*
Bailey, John V.; Cleveland, Thomas H.; and Wirfel, Emanuel W., 4,025,489.
Cline, Edwin Lee, to Clayton Manufacturing Company. Computer type brake analyzer. 4,024,756, Cl. 73-132.000.
Clover, Grace, administratrix: *See—*
Clover, Leonard W., deceased; and Clover, Grace, administratrix, 4,025,807.
Clover, Leonard W., deceased; and by Clover, Grace, administratrix. Electromagnetic motor. 4,025,807, Cl. 310-46.000.
Clubley, Michael H.: *See—*
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CNMP Berthiez: *See—*
Collignon, Robert G., 4,024,673.
Cochrane, Kenneth Alfred, to Robert McGregor & Sons Limited. Tug unit for rail-mounted slip-form paver. 4,025,217, Cl. 404-100.000.
Coffee-Mat Corporation: *See—*
Kull, Leo, 4,025,739.
Cohen, Leonard D.; Kraemer, Erich H.; and Nussbaum, Shlomo, to Cutler-Hammer, Inc. Microwave harmonic power conversion apparatus. 4,025,881, Cl. 333-98.00R.
Collignon, Robert G., to CNMP Berthiez. Machines with a circular blank-holder spindle. 4,024,673, Cl. 51-131.000.
Collins, David R.; and Katz, Sheldon N., to Replacement Products Industries Corporation. Window sash and frame with thermal barrier. 4,024,690, Cl. 52-397.000.
Collins, Joseph M., to Xerox Corporation. Sheet feeder. 4,025,068, Cl. 271-34.000.
Collins, Robert F., to Kendall Company, The. Drape for expanded surgical procedure. 4,024,862, Cl. 128-132.00D.
Colombo, Luigi: *See—*
Montino, Franco; Colombo, Luigi; and Sironi, Giuseppe, 4,025,611.
Colpitts, Ralph W.; Frisch, Kurt C.; and Damusis, Adolfas, to Polythetics, Inc. Dentures. 4,024,636, Cl. 32-2.000.
Colpitts, Ralph W., to Polythetics, Inc. Dentures and process for making the same. 4,024,637, Cl. 32-2.000.
Coltman, John W.; and Jones, Charles H., to Westinghouse Electric Corporation. Conical transducer and reflector apparatus. 4,025,805, Cl. 310-8.700.
Columbia Gas System Service Corporation: *See—*
Reid, Edward A., Jr.; Myler, George W.; and Payne, James E., 4,024,839.
Combustion Engineering, Inc.: *See—*
Forrest, Alan Wayne; and Pelletier, James Paul, 4,024,911.
Siegel, Leon Sidney, 4,025,798.
Comitato Nazionale per l'Energia Nucleare: *See—*
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Commissariat a l'Energie Atomique: *See—*
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Compact Industries, Inc.: *See—*
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Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie: *See—*
Rouzier, Georges, 4,025,454.
Compagnie Honeywell Bull (Societe Anonyme): *See—*
Bottard, Gilles Jean Marcel, 4,025,767.
Compagnie Internationale pour l'Informatique: *See—*
Maury, Christian, 4,025,839.
Computer Automation, Inc.: *See—*
Kaufman, Phillip A.; Gorman, Kenneth C.; Henry, George C.; and Blacksher, Roy, 4,025,903.
Computer Peripherals, Inc.: *See—*
Delaporte, Dany P., 4,025,830.
Connelly, George F., Jr. Inhibited acid composition for cleaning water systems. 4,025,359, Cl. 134-3.000.
Connin, John L.: *See—*
Hunt, William E., Jr.; Connin, John L.; and Steelman, Douglas J., 4,025,186.
Constant, James Nickolas. Digital convolver matched filter and correlator. 4,025,772, Cl. 235-156.000.
Contractor, Rashmikant Maganlal; and Kirayoglu, Birol, to Du Pont de Nemours, E. I., and Company. Process for making an apertured nonwoven fabric. 4,024,612, Cl. 28-72.20F.
Contraves AG: *See—*
Heller, Rudolf, 4,025,256.
Control Data Corporation: *See—*
Norberg, Gayle Russell, 4,025,803.
Control Drug, Inc.: *See—*
Gans, Arnold M.; Goren, Alvin J.; and Gorenberg, Eli M., 4,025,650.
Cook, Herbert: *See—*
Prescott, Norman F.; and Cook, Herbert, 4,024,884.
Cook, Melvin S.; and Atwood, George E., to Duval Corporation. Process and apparatus for the recovery of particulate crystalline product from an electrolysis system. 4,025,400, Cl. 204-10.000.
Cooksey, James Judson: *See—*
Weiss, William Robert; Cooksey, James Judson; and Stables, Wilbur Leon, 4,024,698.
Cooper, Marvin; and Franco, Gino. Apparatus for filling and assembling cups and process therefore. 4,024,694, Cl. 53-282.000.
Copal Company Limited: *See—*
Kawaji, Noboru, 4,024,942.
Corbel, Ange: *See—*
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Cordis Corporation: *See—*
Davies, Gomer L.; and Baker, Ira R., 4,024,864.
Cornford, Arthur Selwyn, to Aerofall Mills Limited. Reversible pivoted bearing. 4,025,133, Cl. 308-73.000.
Corning Glass Works: *See—*
Seward, Thomas P., III, 4,025,191.
Tomb, William H.; and Weetall, Howard H., 4,025,667.
Corson, Wynne Rinnman. Gravity powered timers. 4,024,701, Cl. 58-144.000.
Corte, Herbert; Heller, Harold; Lange, Michael; and Netz, Otto, to Bayer Aktiengesellschaft. Insoluble adsorber resin suitable for treating drinking water and sewage. 4,025,705, Cl. 526-19.000.
Couch, Terry Lee: *See—*
Stein, Robert George; Couch, Terry Lee; and Crovetti, Aldo Joseph, 4,025,531.
Coucher, Robert G.: *See—*
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Coulston, Frederick: *See—*
Korte, Friedrich-Wilhelm A. G. K.; and Coulston, Frederick, 4,025,536.
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Coussot, Gerard, to Thomson-CSF. Elastic surface wave transmitting device for eliminating multiple transit echoes. 4,025,880, Cl. 333-72.000.
Coverdale, Charles E., to Upjohn Company, The. P-(trifluoromethylquinolylamino)benzamides, pharmaceutical dosage forms and method of treatment. 4,025,629, Cl. 424-250.000.
Cox, Dennis T.; Hong, Se J.; and Ostapko, Daniel L., to International Business Machines Corporation. Decoder structure for a folded logic array. 4,025,799, Cl. 307-207.000.
Crabb, Elmer R., to Caterpillar Tractor Co. Combination vehicle service and parking brake. 4,024,936, Cl. 192-4.00A.
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Cramer, Richard David, to Du Pont de Nemours, E. I., and Company. Preparation of 1,4-dienes of high trans-isomer content. 4,025,570, Cl. 260-651.00R.
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Crinkelmeyer, Oliver W., to Dow Chemical Company, The. Method of cementing a well. 4,024,918, Cl. 166-293.000.
Crites, Donald M. Process for manufacturing a two-pole solid rotor. 4,024,628, Cl. 29-598.000.
Croce, Louis J.; Bajars, Laimonis; and Gabliks, Maigonis, to Petro-Tex Chemical Corporation. Oxychlorination of hydrocarbons in the presence of non-halide copper containing catalysts. 4,025,461, Cl. 252-462.000.
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Croll, Monte B.; and Croll, Lionel. Carton for card-mounted goods and the like. 4,025,039, Cl. 229-27.000.
Croopnick, Gerald Allan; and Michaels, John Mark, to Dresser Industries, Inc. Purification apparatus. 4,025,425, Cl. 210-23.00H.
Crosby, Guy A.; DuBois, Grant E.; and Weinshenker, Ned M., to Dynapol Corporation. Sulfoalkylated flavanone sweeteners. 4,025,535, Cl. 260-345.200.
Crose, James R.; and Hartnett, Charles A., to W. R. Grace & Co. Method of masking, venting and coating the inside of a receptacle. 4,025,660, Cl. 427-28.000.
Crosfield Electronics Limited: *See—*
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Csanady, Elmer R.; Mosher, Paul R.; and Camp, Albert T., to United States of America, Navy. Double base propellant containing azobisformamide. 4,025,370, Cl. 149-92.000.

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Daane, Robert A.; Beachler, Edward D.; Vonderau, Raymond C.; and Sokolow, Nickolas N., to Beloit Corporation. Parison oven. 4,025,294, Cl. 432-11.000.
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Davidson, Allen R., Jr.; and Robinson, Timothy G. F., to Westinghouse Electric Corporation. Noise cancellation apparatus. 4,025,724, Cl. 179-1.00P.
Davidson, Melvin John George; and Wunder, Richard Helmut, to Polysar Limited. Latex coagulation process using lignin compound. 4,025,711, Cl. 528-488.000.
Davies, Gomer L.; and Baker, Ira R., to Cordis Corporation. Injector with overspeed protector. 4,024,864, Cl. 128-214.00F.
Davis, George B., Jr. Power operated caulking gun. 4,024,994, Cl. 222-326.000.
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De Fauw, James R. Retractable tool holder. 4,024,778, Cl. 82-36.00R.
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Emblem, Harold Garton: *See—*
Walters, Ian Richard; and Emblem, Harold Garton, 4,025,350.

Emelyanov, Boris Mikhailovich: *See—*
Naidich, Jury Vladimirovich; Lavrinenko, Irina Alexandrovna; Kondratsky, Vladimir Afanasievich; Semenov, Jury Nikolaevich; Emelyanov, Boris Mikhailovich; and Kogosov, Leonid Pinkhusovich, 4,024,675.

Emerson, Ralph Waldo; and Shattuck, John R., to Plasmine Corporation. Urea containing sizing compositions. 4,025,354, Cl. 106-218.000.

End-Dent, Inc.: *See—*
Weiss, Fredric M.; Malkin, David P.; Pugh, James; and Weiss, Charles, 4,024,639.

Endress & Hauser Gmbh & Co.: *See—*
Franz, Hans-Jurgen; and Rottmar, Werner, 4,025,846.

Enemark, Robert B., to Electro Signal Lab, Inc. LED smoke detector circuit. 4,025,915, Cl. 340-237.00S.

Enercon West: *See—*
Furner, Ronald T., 4,024,726.

Energy Development Associates: *See—*
Hart, Thomas G., 4,025,697.

Engel, Hans; and Sorger, Eberhard, to Honeywell Inc. Control valve with noise abating features. 4,024,891, Cl. 137-625.300.

Engel Industries, Inc.: *See—*
Mueller, Thomas L., 4,024,784.

England, Walter F., to Sprague Electric Company. Wet pellet electrolytic capacitor method. 4,024,625, Cl. 29-570.000.

Englisch, Wolfgang: *See—*
Jetter, Heinz Leonhard; Gurs, Karl; and Englisch, Wolfgang, 4,025,790.

English Clays Lovering pochin & Company Limited: *See—*
Webster, John David; and Jewell, Thomas John, 4,025,670.

Enomoto, Satoru; Takita, Hitoshi; Wada, Hisayuki; Mukaida, Yutaka; and Yanaka, Mikiro, to Kureha Kagaku Kogyo Kabushiki Kaisha. High solid content alkyd resin compositions comprising (1-methyl-2-vinyl)4,6-heptadienyl-3,8-nonadienoate. 4,025,475, Cl. 260-22.0CB.

Environment Improvement Systems, Inc.: *See—*
Weiland, Henry J.; and Black, Dewey W., 4,024,881.

Environmental Container Corporation: *See—*
Torcomian, Albert, 4,024,620.

EPPCO: *See—*
Gerek, Gene; and Coucher, Robert G., 4,025,664.

Erdmann, Hans, to ITT Industries, Inc. Brake system for automotive vehicle equipped with Otto engines. 4,024,709, Cl. 60-397.000.

Erdmann, Jurgen, to Erwin Sick Optik-Elektronik. Photoelectric instrument for measuring the length of an object. 4,025,796, Cl. 250-560.000.

Erickson, Bruce G., to American Micro-systems, Inc. Frequency tuning system with visual display. 4,024,750, Cl. 73-6.000.

Erwin, Carl Lloyd; Howett, Michael John; and Nojiri, Howard Hideo, to Bourns, Inc. Reversible snap-action switch with cam operator and lost motion structure. 4,025,738, Cl. 200-6.00B.

Erwin Sick Optik-Elektronik: *See—*
Erdmann, Jurgen, 4,025,796.

Eschard, Gilbert; Duchenois, Valere Dominique Louis; and Polaert, Remy Henri Francois, to U.S. Philips Corporation. Microchannel plate comprising microchannels curved on the output side. 4,025,813, Cl. 313-105.0CM.

Eschwey, Juergen: *See—*
Taugner, Roland; and Eschwey, Juergen, 4,024,779.

Esco Manufacturing Company: *See—*
McClain, James E.; and Scott, Howard L., 4,025,834.

Eshbaugh, Robert W. Sport racket frame and apparatus for producing same. 4,025,072, Cl. 273-73.00F.

Esseluhn, Werner F.: *See—*
Fegley, Charles R.; and Esseluhn, Werner F., 4,024,830.
Fegley, Charles R.; and Esseluhn, Werner F., 4,024,986.

Estrada, Herbert, Jr., to Westinghouse Electric Corporation. Fluid flow measurement apparatus. 4,024,760, Cl. 73-194.00A.

Ethicon, Inc.: *See—*
Stephenson, Martin, 4,024,871.

Ethyl Corporation: *See—*
Plonsker, Larry; and Malec, Robert E., 4,025,451.

Eugene Lutz KG Maschinenfabrik Lomersheim: *See—*
Bergler, Otto; and Lutz, Eugen, 4,024,898.

Euler, Karl, to Siemens Aktiengesellschaft. Telecommunication switching network having a multistage reversed trunking scheme and switching on a four wire basis. 4,025,725, Cl. 179-15.0AT.

Evani, Syamalarao; McKeever, Dennis; and Raymond, Russell J., to Dow Chemical Company, The. Polymeric stabilized dispersions. 4,025,484, Cl. 260-33.6UA.

Evans, Delme: *See—*
Dunwell, David William; Evans, Delme; and Hicks, Terence Alan, 4,025,636.
Dunwell, David William; Evans, Delme; and Hicks, Terence Alan, 4,025,637.

Evdokimov, Boris Alexandrovich: *See—*
Mozhaev, Vasily Pavlovich; Leichenko, Ilya Yakovlevich; Gerasimov, Oleg Yakovlevich; Lyandres, Semen Grigorievich; Zuev, Jury Borisovich; Evdokimov, Boris Alexandrovich; and Matveev, July Alexandrovich, 4,025,355.

Exxon Production Research Company: *See—*
Pujol, Luis, 4,024,919.

Exxon Research and Engineering Company: *See—*
Newman, Neil F., 4,025,695.
Siskin, Michael; and Porcelli, Joseph J., 4,025,577.
Stover, William Harold, 4,025,316.
Wristers, Jos, 4,025,459.

Eymard, Pierre Luc: *See—*
Taillandier, Georges Marcel; Benoit-Guyod, Jean-Louis Alain; Boucherle, Andre Louis; Eymard, Pierre Luc; Broll, Madeleine; and Ferrandes, Bernard, 4,025,649.

F. J. Littell Machine Company: *See—*
Johnson, Kenneth C., 4,024,774.

F. L. Smidth & Co.: *See—*
Touborg, Jorn, 4,025,295.

Faatz, Heinz-Werner: *See—*
Anders, Klaus; and Faatz, Heinz-Werner, 4,025,223.

Fagan, Franklin G., Jr.; and Angelovich, Stephen J., to P. R. Mallory & Co., Inc. Variable precision multivoltage step battery. 4,025,700, Cl. 429-91.000.

Fairchild Camera and Instrument Corporation: *See—*
Smith, Peter R., 4,025,364.

Fajt, John: *See—*
Utterback, Jack Olan; and Fajt, John, 4,024,614.

Famiglietti, Michele; and Sucre, Raul Betancourt. Electrical connection devices. 4,025,146, Cl. 339-147.00P.

Farhadieh, Bahram, to Abbott Laboratories. Stable chelocardin composition. 4,025,654, Cl. 424-330.000.

Farnsworth, Barbara. Greeting card calendar. 4,024,656, Cl. 40-121.000.

Farnworth, Frank: *See—*
Tawil, David S.; Clubley, Michael H.; and Farnworth, Frank, 4,025,608.

Fauran, Claude P.; Bourgery, Guy R.; Raynaud, Guy M.; and Gouret, Claude J., to Delalande S.A. Arylamino pyrimidinic derivatives. 4,025,514, Cl. 260-256.40N.

Fay, Clarence C. Dual displacement disc brake caliper assembly. 4,024,932, Cl. 188-106.00P.

Fegley, Charles R.; and Esseluhn, Werner F. Anti-burglar sound emitting device. 4,024,830, Cl. 116-86.000.

Fegley, Charles R.; and Esseluhn, Werner F. Fluid dispensing anti-burglar device. 4,024,986, Cl. 222-5.000.

Fehlbier, Alois: *See—*
Gruber, Hermann; Fehlbier, Alois; and Ruprecht, Hans-Dieter, 4,025,579.

Feinberg, Irving; and Friedrich, Carl, to Presto Lock Company, division of Walter Kidde & Company, Inc. Roller units. 4,024,600, Cl. 16-31.00R.

Feinberg, Irving; and Friedrich, Carl, to Presto Lock Company, Division of Walter Kidde & Company, Inc. Method of making roller units. 4,024,622, Cl. 29-417.000.

Felstead, E. Barry, to Canadian Patents and Development Limited. Acousto-optic light beam scanner. 4,025,166, Cl. 350-161.00W.

Fenton, Sidney Desmond, to Storey Brothers & Company Limited. Method of making a padded item. 4,025,372, Cl. 156-79.000.

Ferlazzo, Natale; Buzzi, Gian Fausto; Ghirga, Marcello; and Calcagno, Benedetto, to Societa' Italiana Resine S.I.R. S.p.A. Process for preparing methyl acrylate or mixtures thereof with acrylic acid. 4,025,549, Cl. 260-486.00R.

Ferrandes, Bernard: *See—*
Taillandier, Georges Marcel; Benoit-Guyod, Jean-Louis Alain; Boucherle, Andre Louis; Eymard, Pierre Luc; Broll, Madeleine; and Ferrandes, Bernard, 4,025,649.

Ferranti-Packard Limited: *See—*
Cass, Ralph Sherwill, 4,025,442.

Ferrara, John M.; and Smith, Frank Patterson, 2nd, to Narco Scientific Industries, Inc. Synchronous filter for VOR systems. 4,025,923, Cl. 343-106.00R.

Ferrigno, Albert R. Home bag sealer. 4,025,383, Cl. 156-530.000.

Ferry Cap & Set Screw Company, The: *See—*
MacGuire, Andrew E., 4,024,846.

Field, John H., to Sigma Instruments, Inc. Low noise synchronous motors. 4,025,810, Cl. 310-162.000.

Fields, Ellis K.; and Steitz, Alfred, Jr., deceased (by Steitz, Margaret Marie, executrix), to Standard Oil Company (Indiana). Diels-Alder adducts of hexahalocyclopentadiene and dialkyl-alphamethylstyrene. 4,025,569, Cl. 260-649.00R.

Fikentscher, Rolf: *See*—
Miksovsky, Felix; and Fikentscher, Rolf, 4,025,503.

Filip, Stanislaw F., to I.C.S. Ignition Control Systems Ltd. Single push-button switch having visual position indication. 4,025,748, Cl. 200-308.000.

Fineo, Carlo, to Johns-Manville Corporation. Blanket or sheet winding apparatus. 4,025,009, Cl. 242-66.000.

Firm Albin Platsch: *See*—
Platsch, Hans Georg, 4,024,815.

Firm Friedrich Theysohn, The: *See*—
Theysohn, Friedrich; Gienapp, Horst; and Lange, Horst, 4,025,022.

Fisch, Edwin J., to Shell Oil Company. Removal of hydrocarbons and water from acid gas streams. 4,025,322, Cl. 55-48.000.

Fischer, Adolf; Hansen, Hanspeter; and Rohr, Wolfgang, to BASF Aktiengesellschaft. O-alkylsulfonylglycolic anilides. 4,025,544, Cl. 260-456.00A.

Fischer, Helmut; Glatzel, Erhard; Jahn, Walter; and Zajadatz, Heinz, to Carl Zeiss-Stiftung. High speed wide angle objective lens system. 4,025,169, Cl. 350-212.000.

Fisons Limited: *See*—
Parsons, John Henry, 4,025,632.

Fleck, Adolf; Gotze, Christian; and Nagel, Erich, to AGFA-Gevaert, A.G. Web feeding and collecting apparatus for photographic printers or the like. 4,025,005, Cl. 242-75.200.

Fleck, Fritz; and Schmid, Hans-Rudolf, to Sandoz Ltd. Bis-(triazinylamino) stilbene compounds. 4,025,507, Cl. 260-240.00B.

Fleissner, Hans, to Vepa AG. Process for the wet treatment of tension-free guided material. 4,025,304, Cl. 8-151.000.

Fleissner, Heinz, to Vepa AG. Process for the heat-setting of padded or printed continuous synthetic filament groups. 4,025,305, Cl. 8-176.000.

Flexible Steel Lacing Company: *See*—
Henke, Albert E., 4,024,605.

FMC Corporation: *See*—
Kyrias, Gilbert M., 4,024,618.

Fogarty, Derrell Jean. Automatically indexable cutting tool. 4,024,777, Cl. 82-36.00A.

Foley, Dennis D.; and Reynolds, John N., to Alcan Aluminum Corporation. Shielded electric cable. 4,025,715, Cl. 174-36.000.

Food Research-Marketers, Inc.: *See*—
Arenson, Simon Weil, 4,025,656.

Ford Motor Company: *See*—
Adawi, Marwan K.; Briggs, Allan D.; DeLosh, Robert G.; and Smith, Carol S., 4,024,706.
Johnson, Olin B., 4,025,559.

Forlini, Matthew: *See*—
Saxe, Robert L.; Thompson, Robert I.; and Forlini, Matthew, 4,025,163.

Forrest, Alan Wayne; and Pelletier, James Paul, to Combustion Engineering, Inc. Pump shaft seal injection system. 4,024,911, Cl. 165-107.000.

Forster, Brian Michael, to GKN Transmissions Limited. Apparatus for elevating wheeled vehicle. 4,024,960, Cl. 214-1.00A.

Forster, Franz, to Linde Aktiengesellschaft. Axial-piston machine with improved bearing arrangement. 4,024,799, Cl. 91-499.000.

Fotis, James W., to Lawrence Peska Associates, Inc., a part interest. Bubble chum. 4,024,669, Cl. 43-44.990.

Fouracre, Roy E., to Raymond Lee Organization, Inc., The. Simultaneous floor edge and baseboard cleaner. 4,024,597, Cl. 15-28.000.

Franco, Gino: *See*—
Cooper, Marvin; and Franco, Gino, 4,024,694.

Francolini, Ermanno, to SPEM Societa Prodotti Elettronici Meccanici S.r.l. Tape propelling means in cassette-type tape-recorders. 4,025,027, Cl. 226-181.000.

Frank, Charles A., to Owens-Illinois, Inc. Traversing lehr spray. 4,024,836, Cl. 118-323.000.

Frank, Robert J., to Pervel Industries, Inc. Flocked expanded-plastic fabric and method. 4,025,678, Cl. 428-90.000.

Franklin, Benjamin S.: *See*—
Bachman, Charles W.; and Franklin, Benjamin S., 4,025,901.

Franklin, Charles H.: *See*—
Johnstone, Richard T.; Montag, Alfred C.; Franklin, Charles H.; and Vinton, Clarence S., 4,025,062.

Franz, Hans-Jurgen; and Rottmar, Werner, to Endress & Hauser Gmbh & Co. Capacitive sensor. 4,025,846, Cl. 324-61.00P.

Franz, John E., to Monsanto Company. Increasing sucrose content of sugarcane plants with N-phosphonomethylglycinamides. 4,025,332, Cl. 71-86.000.

Frauenfeld, Martin, to Svenska Rotor Maskiner Aktiebolag. Apparatus for cleaning the heat exchanging surfaces of the heat transfer plates of rotary regenerative heat exchangers. 4,025,362, Cl. 134-57.00R.

Fraze, Ermal C.: *See*—
Brown, Omar L., 4,024,981.

Freenor, Francis J., III, to Chevron Research Company. S,S-dialkyl-N-substituted phosphoroamidodithionites. 4,025,585, Cl. 260-956.000.

Frei, Ephraim H.: *See*—
Sollish, Bruce D.; and Frei, Ephraim H., 4,025,165.

Frei, Max, to Schenker Maschinen AG. Apparatus for heat treatment of discrete metallic commodities. 4,025,061, Cl. 266-249.000.

Freiberg, Robert J., to United Technologies Corporation. Compound unstable resonator. 4,025,172, Cl. 350-294.000.

French, George F. Latching magnetic level sensor. 4,025,237, Cl. 417-131.000.

French, Gordon B.; and Ridley, Richard D., to Occidental Petroleum Corporation. Method of enhancing recovery of oil from pillars adjacent in situ oil shaft retort. 4,025,115, Cl. 299-2.000.

Fried. Krupp Gesellschaft mit beschrankter Haftung: *See*—
Ziese, Rolf, 4,025,894.

Fried. Krupp Huttenwerke AG: *See*—
Steinmetz, Eberhard; and Kuhn, Jurgen, 4,025,059.

Friedrich, Carl: *See*—
Feinberg, Irving; and Friedrich, Carl, 4,024,600.
Feinberg, Irving; and Friedrich, Carl, 4,024,622.

Frieseke & Hopfner GmbH Erlangen-Bruck: *See*—
Hartmann, Georg; and Dittner, Adam, 4,025,934.

Frisch, Kurt C.: *See*—
Colpitts, Ralph W.; Frisch, Kurt C.; and Damusis, Adolfas, 4,024,636.

Frisque, Alvin J., to Nalco Chemical Company. Method for enhancing the solubility of dried latex polymer. 4,025,712, Cl. 528-488.000.

Fritz Keiper, Firma: *See*—
Klingelhofer, Gerd; and Werner, Paul, 4,025,109.

Froix, Michael F., to Xerox Corporation. Charge transfer complexes of ferrocenes having light filtering properties. 4,025,541, Cl. 260-439.0CY.

Fuchs, Werner Karl Heinz. Regulatable pump device. 4,025,124, Cl. 303-10.000.

Fuji Photo Film Co., Ltd.: *See*—
Kido, Keishiro; and Arai, Noboru, 4,025,345.
Miyatuka, Hajime; and Honjo, Satoru, 4,025,338.
Takimoto, Masaaki; and Honjo, Satoru, 4,025,340.

Fujie, Masakatsu; Yamamoto, Hiroshi; and Matsuzaki, Atsushi, to Hitachi, Ltd. Molten metal pouring device. 4,025,060, Cl. 266-240.000.

Fujii, Hideo; and Kato, Minoru, to Nippondenso Co., Ltd. Ignition device for an internal combustion engine with cam design for preventing undesired firings. 4,024,844, Cl. 123-41.00R.

Fujikura, Yoshiaki; Inamoto, Yoshiaki; Ikeda, Hiroshi; and Takaishi, Naotake, to Kao Soap Co., Ltd. 4-Homoisotwistyl bromide. 4,025,568, Cl. 260-648.00R.

Fujimoto, Isao; Kasubuchi, Takeshi; and Aiba, Masahiko, to Sharp Kabushiki Kaisha. Phase synchronization for ink jet system printer. 4,025,926, Cl. 346-1.000.

Fujinaga, Yoshikazu: *See*—
Setsuie, Takashi; Fujinaga, Yoshikazu; and Mimura, Koji, 4,025,279.

Fujinami, Akira: *See*—
Kirino, Osamu; Ooishi, Tadashi; Kameda, Nobuyuki; Kato, Toshiro; Ozaki, Toshiaki; and Fujinami, Akira, 4,025,651.

Fujita, Hiroshi: *See*—
Miki, Tosaku; Hosokawa, Yasuhiro; Miwa, Tamotsu; Fujita, Hiroshi; Asano, Masahide; and Aibara, Shunzo, 4,025,644.

Fujita, Yoshiji; Omura, Yoshiaki; Nishida, Takashi; and Itoi, Kazuo, to Kuraray Co., Ltd. Process for preparing 2-substituted or unsubstituted geranyl acetic acids and esters thereof. 4,025,539, Cl. 260-404.000.

Fujiwara, Hiroshi; Jawara, Kinya; Miyoshi, Kaoru; and Mukai, Makoto, to Maruzen Oil Co. Ltd. Method for diaphragm electrolysis of alkali metal halides. 4,025,401, Cl. 204-98.000.

Fujiwara, Katsuji. Apparatus for returning condensate. 4,025,236, Cl. 417-128.000.

Fukasawa, Toshiro: *See*—
Takagi, Katsuhide; and Fukasawa, Toshiro, 4,025,174.

Funakoshi, Tokushi: *See*—
Sanbongi, Koji; Funakoshi, Tokushi; Tanaka, Tomoo; and Ueda, Syuzo, 4,025,368.

Furman, Anthony H., to General Electric Company. Variable length extrusion die. 4,025,262, Cl. 425-145.000.

Furner, Ronald T., to Enercon West. Solar heat trap for building windows. 4,024,726, Cl. 62-2.000.

Furr, Robert L.; and Hayes, Robert I., Jr. Table soccer or football game structure. 4,025,073, Cl. 273-85.00D.

Furutuki, Yasuko: *See*—
Kitamura, Keiji; and Furutuki, Yasuko, 4,024,661.

G. D. Searle & Co.: *See*—
Adelstein, Gilbert W.; and Sause, H. William, 4,025,524.
Goldkamp, Arthur H.; Mazur, Robert H.; and Schlatter, James M., 4,025,551.

Gabliks, Maigonis: *See*—
Croce, Louis J.; Bajars, Laimonis; and Gabliks, Maigonis, 4,025,461.

Gainesville Machine Company, Inc.: *See*—
Harben, Grover S., Jr.; and Graham, Kenneth Z., 4,024,603.

Gamboa, Carlos E., to Raymond Lee Organization, Inc., The, a part interest. Shoe cleaner machine. 4,024,599, Cl. 15-311.000.

Ganellin, Charon Robin: *See*—
Durant, Graham John; and Ganellin, Charon Robin, 4,025,527.

Gans, Arnold M.; Goren, Alvin J.; and Gorenberg, Eli M., to Control Drug, Inc. Method and composition for preventing nutritional deficiency. 4,025,650, Cl. 424-319.000.

Garber, Jan W.; and Davisson, De Wayne G., to Baxter Travenol Laboratories, Inc. Method for separation of cryoprecipitate from blood plasma. 4,025,618, Cl. 424-101.000.

Garcia, Luis: *See—*
Leasure, William; Garcia, Luis; Reifel, Charles; and Shelton, Jack, 4,024,693.

Garcia, Luis A.; and Ordonez, Guido A., to Baxter Laboratories, Inc. Preparation of albumin by fractionation of blood plasma or serum. 4,025,500, Cl. 260-112.00B.

Garner, Robert; and Petitpierre, Jean-Claude, to Ciba-Geigy Corporation. Pressure-sensitive copying or recording material. 4,025,089, Cl. 282-27.500.

Gaskell, Alfred J., to Pako Corporation. Paper retarding control mechanism for photographic dryer. 4,024,649, Cl. 34-155.000.

Gasper, John A.: *See—*
Hansen, Barton G.; Goetz, Charles P.; and Gasper, John A., 4,024,691.

Gates, Walter C., Jr.: *See—*
Suggitt, Robert M.; and Gates, Walter C., Jr., 4,025,561.

Gautheron, Jean-Francois, to La Telemecanique Electrique. Power supply with chopping circuit. 4,025,862, Cl. 321-2.000.

Gavinet, Jean: *See—*
Decours, Jacques; and Gavinet, Jean, 4,024,743.

GCA Corporation: *See—*
Webb, David B., 4,025,242.

Gebr. Eickhoff, Maschinenfabrik und Eisengiesserei m.b.H.: *See—*
Lanfermann, Willy; and Renzing, Otto, 4,025,118.

Gedeon, Nelson J., to Towmotor Corporation. Movable fuel tank mount. 4,025,080, Cl. 280-5.00A.

Geer, Larry A., to Adams Rite Products, Inc. Latch mechanism for cabinet closure means. 4,025,096, Cl. 292-158.000.

Geffner, Ted. Antifriction bearings. 4,025,128, Cl. 308-6.00C.

Gehl Company: *See—*
Hanson, Darwin M., 4,024,804.
Schirer, David K., 4,024,970.

Gelman, Charles; and Vadnay, Attila, to Gelman Instrument Company. Water filter device. 4,025,438, Cl. 210-484.000.

Gelman Instrument Company: *See—*
Gelman, Charles; and Vadnay, Attila, 4,025,438.

Gencsoy, Hasan T., to United States of America, Energy Research and Development Administration. High pressure rotary piston coal feeder for coal gasification applications. 4,025,317, Cl. 48-86.00R.

General Aviation Electronics, Inc.: *See—*
Atkinson, Lowell G., 4,025,855.

General Electric Company: *See—*
Barkan, Philip; and Sharp, William Thomas, 4,025,886.
Brissey, George Edward; and Richter, Eike, 4,025,840.
Furman, Anthony H., 4,025,262.
LaConti, Anthony B., 4,025,412.
Loeb, Leopold, 4,025,427.
McCarty, William J., 4,024,722.
McVey, Charles I., 4,025,812.
Peil, William, 4,025,871.
Richards, William D. C.; Lilly, James L.; and Gray, Lawrence E., 4,025,248.
Rossi, Anthony J.; and Behringer, Donald F., 4,025,762.

General Instrument Corporation: *See—*
Munday, John Charles; and McDonald, Andrew, 4,025,865.

General Kinematics Corporation: *See—*
Musschoot, Albert, 4,025,419.

George Fisher Aktiengesellschaft: *See—*
Baumann, Gerhard; and Wuchner, Xaver, 4,025,219.

Gerasimov, Oleg Yakovlevich: *See—*
Mozhaev, Vasily Pavlovich; Leichenko, Ilya Yakovlevich; Gerasimov, Oleg Yakovlevich; Lyandres, Semen Grigorievich; Zuev, Jury Borisovich; Evdokimov, Boris Alexandrovich; and Matveev, July Alexandrovich, 4,025,355.

Gerek, Gene; and Coucher, Robert G., to EPPCO. Container coating method. 4,025,664, Cl. 427-183.000.

Gerkin, Michael Edward: *See—*
Petke, Frederick Edward; Kirch, John Nicholas; and Gerkin, Michael Edward, 4,025,346.

Gertsch AG: *See—*
Krob, Erwin; Weigl, Erwin; and Svoboda, Josef, 4,025,087.

Gesswein, Francis I.: *See—*
Shaw, John B.; Blatt, Peter R.; and Gesswein, Francis I., 4,025,793.

Ghirga, Marcello: *See—*
Ferlazzo, Natale; Buzzi, Gian Fausto; Ghirga, Marcello; and Calcagno, Benedetto, 4,025,549.

Giangiulio, Clayton. Lamp. 4,025,290, Cl. 431-324.000.

Giannini, Gabriel M. Sealed permanent magnet switch. 4,025,885, Cl. 335-154.000.

Gienapp, Horst: *See—*
Theysohn, Friedrich; Gienapp, Horst; and Lange, Horst, 4,025,022.

Gifford, Charles R.: *See—*
Bolz, Gunner; Deindoerfer, Fred H.; Gifford, Charles R.; and Kameda, Naomi, 4,025,310.

Giguere, Robert P.; Washburn, Robert D.; and Wakalopulos, George, to Hughes Aircraft Company. Wire ion plasma electron gun. 4,025,818, Cl. 315-337.000.

Gilbert, Saul: *See—*
Bassett, James G., Jr.; and Gilbert, Saul, 4,024,624.

Giles, Donald Beresford, to K. D. G. Instruments Limited. Method and apparatus for measuring length. 4,024,645, Cl. 33-129.000.

Gilles, Herbert L.: *See—*
Shipman, Johnson; and Gilles, Herbert L., 4,024,764.

Gilles, Jack Conrad, to B. F. Goodrich Company, The. Hydroxyphenylalkyleneyl isocyanurate/pentaerythritol phosphite combinations as ultraviolet light stabilizers for polyolefins. 4,025,486, Cl. 260-45.8NT.

Gilmour, George A.: *See—*
Jefferies, Larry D.; and Gilmour, George A., 4,025,919.

Giras, Theodore C.; and Podolsky, Leaman, to Westinghouse Electric Corporation. System and method for operating a steam turbine with improved control information display. 4,025,765, Cl. 235-151.210.

Girdler, George W., to Steinberg, Jack, a part interest. Tie clasp. 4,024,585, Cl. 2-153.000.

Girling Limited: *See—*
Brearley, Malcolm, 4,025,781.
Sawyer, Patrick Frank, 4,024,795.

GKN Transmissions Limited: *See—*
Forster, Brian Michael, 4,024,960.

Glasson, Jean Emile, to Botalam. Machine for compacting and tying coils. 4,024,805, Cl. 100-12.000.

Glasurit Werke M. Winkelmann AG: *See—*
Hossenfelder, Klaus, 4,025,672.

Glatzel, Erhard: *See—*
Fischer, Helmut; Glatzel, Erhard; Jahn, Walter; and Zajadatz, Heinz, 4,025,169.

Glauert, Wolfram: *See—*
Klinger, Helmut; and Glauert, Wolfram, 4,024,759.

Gloge, Detlef Christoph; Kaminow, Ivan Paul; and Presby, Herman Melvin, to Bell Telephone Laboratories, Incorporated. Graded-index fiber for multimode optical communication. 4,025,156, Cl. 350-96.0WG.

Glory Kogyo Kabushiki Kaisha: *See—*
Hatanaka, Yoshihiro; Shigemori, Hideto; and Ueba, Akio, 4,025,758.

Gloss, Erwin: *See—*
Adler, Karl-Heinz; Drews, Ulrich; Gloss, Erwin; and Kugelmann, Adolf, 4,024,843.

Gluzek, Karl-Heinz: *See—*
Sandhack, Lothar; Webers, Werner; Michalczyk, Georg; and Gluzek, Karl-Heinz, 4,025,534.

Godard, Pierre; and Prevot, Claude, to Saft-Societe des Accumulateurs Fixes et de Traction. Method and device for charging and heating at low temperature a sealed storage cell battery. 4,025,861, Cl. 320-23.000.

Goderbauer, Lodewijk, to B.V. Schroefboutenfabriek v.h.Everts en van der Weijden. Method of making a resilient double C-shaped clip for securing a rail on a support and a clip made by the use of this method. 4,025,044, Cl. 238-349.000.

Goel, Narendra S., to Xerox Corporation. Transfer apparatus for a color electrophotographic printing machine. 4,025,182, Cl. 355-4.000.

Goertz, Harvey Maurice, to O. M. Scott & Sons Company. Particulate urea-formaldehyde fertilizer composition and process. 4,025,329, Cl. 71-3.000.

Goetz, Charles P.: *See—*
Hansen, Barton G.; Goetz, Charles P.; and Gasper, John A., 4,024,691.

Goff, McKinley; and Hampton, Edward L., to Leggett & Platt Incorporated. Rocker base. 4,025,020, Cl. 248-385.000.

Goldammer, Georg; and Beitzinger, Kurt, to Schubert & Salzer Maschinenfabrik Aktiengesellschaft. Sliver resolving apparatus for open-end spinning machines. 4,024,699, Cl. 57-58.910.

Goldkamp, Arthur H.; Mazur, Robert H.; and Schlatter, James M., to G. D. Searle & Co. 3-Amino-N-substituted succinamic acids. 4,025,551, Cl. 260-518.00R.

Goldner, Klaus: *See—*
Howe, Harald; and Goldner, Klaus, 4,025,259.

Goloff, Alexander, to Caterpillar Tractor Co. Cooled rotor. 4,025,245, Cl. 418-94.000.

Goodnight, Hershel: *See—*
Reed, Robert D.; and Goodnight, Hershel, 4,025,282.

Goodwin, Vernon, Jr., to Pleasantaire Industries, Ltd. Portable ventilating air filtering device for toilets. 4,025,325, Cl. 55-357.000.

Goodyear Aerospace Corporation: *See—*
Arnold, John B.; Bowyer, John M.; Hegbar, Howard R.; and Shaefer, Archie B., 4,025,916.

Gordon, Robert M. Solar heater. 4,024,853, Cl. 126-271.000.

Goren, Alvin J.: *See—*
Gans, Arnold M.; Goren, Alvin J.; and Gorenberg, Eli M., 4,025,650.

Gorenberg, Eli M.: *See—*
Gans, Arnold M.; Goren, Alvin J.; and Gorenberg, Eli M., 4,025,650.

Gorgens, Richard A., to Incoterm Corporation. System for on-line processing of banking transactions. 4,025,905, Cl. 340-172.500.

Gorman, Kenneth C.: *See—*
Kaufman, Phillip A.; Gorman, Kenneth C.; Henry, George C.; and Blacksher, Roy, 4,025,903.

Gosney, William Milton, to Texas Instruments Incorporated. Regenerative MOS transistor charge detectors for charge coupled device shift registers in a multiplexing system. 4,025,801, Cl. 307-362.000.

Goto, Irving A. Advertising pocket for shopping carts. 4,024,660, Cl. 40-308.000.

Gotschy, Friedrich: *See—*
Sasshofer, Franz; Gotschy, Friedrich; Kraasig, Johannes; and Wimmer, Adalbert, 4,025,598.

Gott Mfg. Co., Inc.: *See—*
Branscum, Tony E., 4,024,731.

Gotze, Christian: *See—*
Fleck, Adolf; Gotze, Christian; and Nagel, Erich, 4,025,005.

Gould Inc.: *See—*
Hou, Shou L.; Beasley, James D.; and Koneval, Donald J., 4,025,928.
Gould, Rex William: *See—*
Dorrn, Clive; and Gould, Rex William, 4,025,465.
Gouret, Claude J.: *See—*
Fauran, Claude P.; Bourgery, Guy R.; Raynaud, Guy M.; and Gouret, Claude J., 4,025,514.
Gournelle, Maurice Paul. Apparatus for the production of containers and objects made of thermoplastic materials, carrying printed motifs. 4,025,275, Cl. 425-387.00R.
Grable, Donovan B. Well installations employing non-metallic lines, tubing casing and machinery. 4,024,913, Cl. 166-72.000.
Graco Metal Products, Inc.: *See—*
Saint, David, 4,025,083.
Graf von Berckheim, Constantin. Electrostatic precipitator with television receiver. 4,025,323, Cl. 55-139.000.
Graham, Kenneth Z.: *See—*
Harben, Grover S., Jr.; and Graham, Kenneth Z., 4,024,603.
Grallien, Jean-Claude; and Corbel, Ange, to Thomson-CSF. Low light level image pick-up tube arrangement. 4,025,955, Cl. 358-219.000.
Granges Essem Aktiebolag: *See—*
Jonason, Karl Gunnar, 4,024,619.
Jonason, Karl Gunnar, 4,025,035.
Grapes, Eugene F.: *See—*
Patterson, W. W., III; and Grapes, Eugene F., 4,025,052.
Graupe, Daniel; and Causey, G. Donald, to Biocommunications Research Corporation. Method of and means for adaptively filtering near-stationary noise from speech. 4,025,721, Cl. 179-1.00P.
Gray, Alden J.; Sanderson, Ian S.; and Hardy, John C., to Maremont Corporation. Variable reluctance A.C. electrical generator and method of making same. 4,025,960, Cl. 310-168.000.
Gray, Larry O.: *See—*
Lafever, Edward E.; and Gray, Larry O., 4,025,819.
Gray, Lawrence E.: *See—*
Richards, William D. C.; Lilly, James L.; and Gray, Lawrence E., 4,025,248.
Grayzel, Alfred I. Negative resistance network. 4,025,872, Cl. 330-34.000.
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., to Millmaster Onyx Corporation. Anti-microbial quaternary ammonium co-polymers. 4,025,617, Cl. 424-78.000.
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., to Millmaster Onyx Corporation. Microbiocidal polymeric quaternary ammonium compounds. 4,025,627, Cl. 424-248.400.
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., to Millmaster Onyx Corporation. Microbiocidal polymeric quaternary ammonium compounds. 4,025,653, Cl. 424-325.000.
Green, Jarrell T., to UOP Inc. Method and system for fractionation heat balance control. 4,025,396, Cl. 203-2.000.
Green, Jarrell T., to UOP Inc. Method and system for fractionation control responsive to heat balance. 4,025,397, Cl. 203-2.000.
Green, John Foster, to Compact Industries, Inc. Cup and package of cups. 4,024,951, Cl. 206-217.000.
Green Shield Trading Stamp Company Limited: *See—*
Wood, William, 4,025,385.
Greenberg, Donald K., to Barnes Drill Co. Magnetic separating apparatus. 4,025,433, Cl. 210-223.000.
Greenberg, Paul Burton; and Kit, Harry John, to United Technologies Corporation. Variable area turbine. 4,025,227, Cl. 415-160.000.
Greenberg, Sanford. Security lock latch. 4,025,097, Cl. 292-207.000.
Greenstein, Bernard, to Owens-Illinois, Inc. Multiple pass method of applying printing paste upon a substrate. 4,025,669, Cl. 427-226.000.
Gregorius, Klaus: *See—*
Janner, Karl; and Gregorius, Klaus, 4,025,787.
Grengg, Walter M.; and Weitzmann, Karl E., to Barber-Colman Company. Commutating machine with integral speed control. 4,025,808, Cl. 310-68.00B.
Gresen Manufacturing Company: *See—*
Stephens, William T., 4,025,243.
Grew, Edward Leon; and Wilson, Nigel David Vaughan, to Macfarlan Smith Limited. Dehydrohalogenation of a 7-halodihydrocodeinone dialkyl ketal. 4,025,520, Cl. 260-285.000.
Grey Lab. Establishment, The: *See—*
Scheffel, Kurt M., 4,025,759.
Grieshop, Jerry; and Grieshop, Maurice, to J & M Manufacturing Co., Inc. Wagon box having side and center delivery from one opening. 4,024,939, Cl. 193-5.000.
Grieshop, Maurice: *See—*
Grieshop, Jerry; and Grieshop, Maurice, 4,024,939.
Griffin Products Incorporated: *See—*
Barford, John Cowper, 4,024,587.
Griffith, James O.: *See—*
Williams, Leland E.; and Griffith, James O., 4,024,816.
Griggs, Elmer L. Vane gauging and aligning machine. 4,024,646, Cl. 33-174.00P.
Grimaud, Edouard: *See—*
Blaise, Jean; and Grimaud, Edouard, 4,025,709.
Tournut, Claude; and Grimaud, Edouard, 4,025,481.
Gronert, Ronald. Assembly building having floor elements supported between superimposed columns. 4,024,686, Cl. 52-282.000.
Grossbach, Alfred; and Mertin, Ralf, to Lunke & Sohn GmbH. Sliding door for vehicles, especially automobiles. 4,025,104, Cl. 296-155.000.
Grote, Stanley G.: *See—*
Trawick, James C., III, 4,025,922.
Grubb, Daniel Baker, to AMP Incorporated. Pneumatically operated cable-slitting tool. 4,024,794, Cl. 91-189.00A.
Gruber, Hermann; Fehlbier, Alois; and Ruprecht, Hans-Dieter, to Bayer Aktiengesellschaft. Process for the production of sheet-like structures. 4,025,579, Cl. 260-858.000.
Grumman Aerospace Corporation: *See—*
Wakefield, Fancher B., 4,025,092.
Gruner, Hans. Mechanical handling apparatus. 4,024,959, Cl. 214-1.0BB.
Gschwend, Heinz Werner; and Hillman, Malvin Jason, to Ciba-Geigy Corporation. Aromatic dicarboxamides. 4,025,505, Cl. 260-239.30B.
GTE Automatic Electric (Canada) Limited: *See—*
Verbaas, George, 4,025,727.
GTE Automatic Electric Laboratories Incorporated: *See—*
Oades, John Willson, 4,025,854.
Pachynski, Alvin L., Jr., 4,025,720.
GTE Sylvania Incorporated: *See—*
Brown, Stephen V., 4,025,285.
Cheney, Richard Frank; Lafferty, William Daniel; and Long, George Jacob, 4,025,334.
Cleveland, Joseph J., 4,025,462.
Eckenbrecht, Robert R., 4,025,951.
Eckenbrecht, Robert R., 4,025,952.
Nordberg, Svein T.; and Shaner, Donald R., 4,025,150.
Guardian Electric Manufacturing Company: *See—*
Wright, William Warren; Rowell, John J.; and Canty, Edgar P., 4,025,884.
Guichet, Niles F. Dental articulator. 4,024,640, Cl. 32-32.000.
Guillot, Jack, to Bennes Marrel. Sealing device for a rotary heat exchanger, in particular for a gas turbine. 4,024,905, Cl. 165-9.000.
Gulbenk, Alin H., to Dow Chemical Company, The. Selectively herbicidal 4,6-dibromo-5-hydroxy-2-pyridine carboxamide, salts and esters thereof and methods of preparation and use. 4,025,333, Cl. 71-94.000.
Gump, William E. Draw-tight connector. 4,025,211, Cl. 403-361.000.
Guran, Zenon: *See—*
Menon, Sukumaran K.; and Guran, Zenon, 4,025,181.
Gurs, Karl: *See—*
Jetter, Heinz Leonhard; Gurs, Karl; and Englisch, Wolfgang, 4,025,790.
Gustafsson, Berth Ulrik, to Projectus Industriprodukter AB. Method of and an installation for controlling the temperature of a plurality of rooms having mutually differing and varying heating requirements, among which rooms there is normally a cooling requirement. 4,024,728, Cl. 62-79.000.
Guy, Michael G.; and Powers, Richard G., to Powers, Richard G.; Guy, Michael G.; Stern, James F.; and Stern, Robert M. Timed-release aspirin. 4,025,613, Cl. 424-21.000.
Gyimothy, Gabor; and Tresch, Josef. Dispenser with at least one ejection opening for individual emission of particles of a uniform shape and size, predosed as bulk material. 4,024,984, Cl. 221-203.000.
Gyurik, Robert J.; and Kingsbury, William D., to SmithKline Corporation. Methods and compositions using 5-cycloalkylthio- and oxy-2-carbalkoxy-aminobenzimidazole. 4,025,638, Cl. 424-273.000.
H. B. Fuller Company: *See—*
Dewey, Lloyd G.; and Jezeski, James J., 4,025,628.
H. H. Robertson Company: *See—*
Holmgren, Robert E., 4,024,684.
Haarkotter, Hermann: *See—*
Schafer, Horst-Dieter; Witzel, Manfred; Loosen, Paul; and Haarkotter, Hermann, 4,025,213.
Haas, Ernst: *See—*
Martin, Joachim; Haas, Ernst; Reuschel, Konrad; and Schnoller, Manfred, 4,025,365.
Haase, Jaroslav: *See—*
Wegmuller, Hans; and Haase, Jaroslav, 4,025,428.
Hach Chemical Company: *See—*
Hach, Clifford C., 4,025,309.
Hach, Clifford C., to Hach Chemical Company. Carbon nitrogen test system. 4,025,309, Cl. 23-230.0PC.
Haefele, John William, to Procter & Gamble Company, The. Oral compositions for plaque, caries and calculus retardation with reduced staining tendencies. 4,025,616, Cl. 424-52.000.
Haferkamp, Dirk; Hodzic, Alija; and Winter, Ulrich, to Hochtemperatur-Reactorbau GmbH. Nuclear power plant with closed gas-cooling circuit comprising multiple identical thermodynamic circuits. 4,025,387, Cl. 176-60.000.
Haff, Frederick, Jr. Sewing machine feeding and cutting attachment for elastic stripping. 4,024,824, Cl. 112-121.260.
Hagan, James Patrick: *See—*
Owens, Ben Howard; LeFevre, Clyde Eugene; and Hagan, James Patrick, 4,025,177.
Hagerty, Royal M.: *See—*
Latimer, John P.; Hagerty, Royal M.; and Zahn, George A., 4,024,758.
Haigh, Daniel H.; and Hall, Richard H., to Dow Chemical Company, The. Valve and method for aqueous systems. 4,024,882, Cl. 137-2.000.
Haizinger, Ferdinand, to Koflach Sportgerate Ges. m.b.H. Apparatus for connecting a shoe sole to its shaft. 4,024,594, Cl. 12-4.200.
Hale, Dean H. Medical stools. 4,025,112, Cl. 297-411.000.

Hale Fire Pump Company: *See—*
Eberhardt, H. Alfred; Hoffman, Kenneth F.; and Petersen, Raymond R., 4,024,886.
Hall, Loyd Reese, to Allied Chemical Corporation. Fail-safe interlock system. 4,024,897, Cl. 141-392.000.
Hall, Richard H.: *See—*
Haigh, Daniel H.; and Hall, Richard H., 4,024,882.
Halle Industries Inc.: *See—*
Kittle, Keith B., 4,025,138.
Hamaguchi, Youshi; Yukami, Noboru; Tomioka, Tatsuyuki; Shimizu, Yoshihito; and Kondo, Hiroyuki, to Matsushita Electric Industrial Co., Ltd. Semiconductor piezoresistive strain transducer. 4,025,890, Cl. 338-2.000.
Hamanaka, Ernest S.; and Stam, John G., to Pfizer Inc. Broad Spectrum antibiotics. 4,025,504, Cl. 260-239.100.
Hamanaka, Ernest S.; and Stam, John G., to Pfizer Inc. Broad spectrum antibiotics. 4,025,506, Cl. 260-239.100.
Hamilton Company: *See—*
Howlett, Donald E., 4,024,865.
Hamilton, George Henry. Solar energy power generating array. 4,025,786, Cl. 250-211.00R.
Hampton, Edward L.: *See—*
Goff, McKinley; and Hampton, Edward L., 4,025,020.
Hamrick, Joseph T.; and Rose, Leslie C. Hydrogen generating system. 4,024,912, Cl. 166-57.000.
Hanada, Yoshihiro, to Minolta Camera Kabushiki Kaisha. Toner-replenishing apparatus for use in dry process electrostatic copier. 4,024,993, Cl. 222-272.000.
Hanna, John E., to Motorola, Inc. Low distortion amplifier having high slew rate and high output impedance. 4,025,870, Cl. 330-20.000.
Hannon, Martin J., to Celanese Corporation. Process for coating surfaces with metal-containing powder coating compositions. 4,025,665, Cl. 427-192.000.
Hansen, Barton G.; Goetz, Charles P.; and Gasper, John A., to Roblin Industries, Inc. Corner key reinforcement brace. 4,024,691, Cl. 52-656.000.
Hansen, Hanspeter: *See—*
Fischer, Adolf; Hansen, Hanspeter; and Rohr, Wolfgang, 4,025,544.
Hansen, Niels Junior: *See—*
Hintze, William; and Hansen, Niels Junior, 4,025,896.
Hanson, Darwin M., to Gehl Company. Rotary baling machine with twine feeding mechanism and articulated drive assembly. 4,024,804, Cl. 100-5.000.
Hanson, Edwin E.: *See—*
Anderson, Arlynn W.; Dester, Delbert D.; and Hanson, Edwin E., 4,024,775.
Hara, Hirohito; and Shimamura, Hironori, to Nippon Electronics Memory Industry Co., Ltd. Multi-stage astable multivibrator. 4,025,877, Cl. 331-113.00R.
Harben, Grover S., Jr.; and Graham, Kenneth Z., to Gainesville Machine Company, Inc. Low noise vacuum lung machine. 4,024,603, Cl. 17-11.000.
Harding Development Company: *See—*
Hawk, Gary D., 4,025,205.
Hardtmann, Goetz E., to Sandoz, Inc. N-alkylcarbonyloxyalkyl isatoic and 3-azaisatoie anhydrides. 4,025,511, Cl. 260-244.00A.
Hardy, John C.: *See—*
Gray, Alden J.; Sanderson, Ian S.; and Hardy, John C., 4,025,960.
Haren, Doyle V.; and Logan, Arthur D., to Dayco Corporation. Compressible printing blanket and method of manufacture. 4,025,685, Cl. 428-304.000.
Harlang, Bent, to Kevi A/S. Housing for castors having twin rollers. 4,024,601, Cl. 16-31.00R.
Harnischfeger Corporation: *See—*
Hedeen, Nils E., 4,024,969.
Harper, David H.: *See—*
Chamberlain, Savvas G.; and Harper, David H., 4,025,943.
Harries, John Edward, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Industry in Her Britannic Majesty's Government of the. Filters for gas detectors. 4,025,792, Cl. 250-343.000.
Harris, Robert F., to United States of America, National Aeronautics and Space Administration. Method for fabricating a mass spectrometer inlet leak. 4,025,327, Cl. 65-54.000.
Hart, Thomas G., to Energy Development Associates. Apparatus for circulating electrolyte around multi-section batteries. 4,025,697, Cl. 429-70.000.
Hartley, James N.; and Jansen, George, Jr., to United States of America, Energy Research and Development Administration. Borehole sealing method and apparatus. 4,024,916, Cl. 166-288.000.
Hartman, Russell E.; and Henderson, Dewey D., to Dayco Corporation. Endless power transmission belt structure. 4,024,773, Cl. 74-233.000.
Hartmann, Georg; and Dittner, Adam, to Frieseke & Hopfner GmbH Erlangen-Bruck. Method and device for determining a value corresponding to the number of revolutions or the angle of rotation of an axle. 4,025,934, Cl. 324-163.000.
Hartnett, Charles A.: *See—*
Crose, James R.; and Hartnett, Charles A., 4,025,660.
Hasegawa, Kazuhiko: *See—*
Nakao, Hisaji; Naruse, Katutoshi; Hasegawa, Kazuhiko; Kawade, Sadao; Tokura, Yasufumi; and Matsuno, Kazuo, 4,025,902.
Hasegawa, Masashi: *See—*
Yamashita, Mitsuo; Mikogami, Akio; Hasegawa, Masashi; and Oizumi, Hiroshi, 4,025,464.
Hasekden, Geoffrey Gordon. Distillation processes and apparatus. 4,025,398, Cl. 203-25.000.
Haseloff, Fritz. Lawn mower. 4,024,695, Cl. 56-15.400.
Haselwood, Donald E.; and Solar, Carl M., to A.C. Nielsen Company. Automatic monitor for programs broadcast. 4,025,851, Cl. 325-31.000.
Hasuda, Tetsuhiko: *See—*
Kobayashi, Kazuo; Ohmori, Shiroh; Hasuda, Tetsuhiko; Shiraishi, Minoru; and Arai, Satoshi, 4,025,689.
Hatanaka, Yoshihiro; Shigemori, Hideto; and Ueba, Akio, to Glory Kogyo Kabushiki Kaisha. Automatic money-issuing apparatus. 4,025,758, Cl. 235-61.70R.
Hathway, John Trevor, to Imperial Chemical Industries Limited. Separation process. 4,025,573, Cl. 260-674.00A.
Hauni-Werke Korber & Co., KG: *See—*
Reuland, Joachim, 4,025,770.
Haupt, Eugene J.: *See—*
Kotas, John A.; and Haupt, Eugene J., 4,025,029.
Hausladen, Joe, to Lawrence Peska Associates, Inc. Latch apparatus. 4,025,095, Cl. 292-108.000.
Hautau, Charles F. Apparatus for transferring articles. 4,024,963, Cl. 214-6.0BA.
Havens, Carl B., to Dow Chemical Company, The. Method and apparatus for the preparation of plastic articles by extrusion. 4,025,253, Cl. 425-72.00R.
Haverdink, Virgil Dean, to Deere & Company. Root crop harvester. 4,024,920, Cl. 171-58.000.
Hawk, Gary D., to Harding Development Company. Paint roller support for paint tray. 4,025,205, Cl. 401-121.000.
Hawkins, Kenneth R.: *See—*
Krase, Kenneth P.; and Hawkins, Kenneth R., 4,025,780.
Hayakawa, Yoshito, to Yamada Iryo Shomei Kabushiki Kaisha. Clinical illumination apparatus. 4,025,777, Cl. 240-1.400.
Hayakawa, Yoshito, to Yamada Iryo Shomei Kabushiki Kaisha. Focusing device for sealed type multi-lamp for obtaining shadowless illumination. 4,025,778, Cl. 240-1.400.
Hayashi, Nobuyuki: *See—*
Tsukada, Katsushige; Isobe, Asao; Ishimaru, Toshiaki; Hayashi, Nobuyuki; and Abo, Masahiro, 4,025,348.
Hayes, Robert I., Jr.: *See—*
Furr, Robert L.; and Hayes, Robert I., Jr., 4,025,073.
Hayner, Paul F., to Sanders Associates, Inc. Fluid actuated gyroscope. 4,024,769, Cl. 74-5.120.
Haynes, Ronald, to Herbert Terry & Sons Limited. Worm drive hose clips. 4,024,609, Cl. 24-274.00R.
Hayosh, Thomas David; and Carosella, John Henry, to Schiller Industries, Inc. Optical system for code symbol scanners. 4,025,761, Cl. 235-61.11E.
Head, Claude Dedmond, III: *See—*
Adams, Anthony Lionel; and Head, Claude Dedmond, III, 4,024,944.
Hearing Health Group, Inc.: *See—*
Blackledge, Vernon O., 4,025,723.
Heating Elements Limited: *See—*
Bennet, Geoffrey Robert, 4,025,753.
Heckler & Koch GmbH: *See—*
Moller, Tilo, 4,024,792.
Hedeen, Nils E., to Harnischfeger Corporation. Multiple cable suspension assembly. 4,024,969, Cl. 214-135.00R.
Hedrick, Lewis W. Rotary jet reaction turbine. 4,024,705, Cl. 60-39.16C.
Hedstrom, Martin; Olesen, Carsten; and Vind, Tyge, to Stal-Laval Turbin AB. Control valve unit for a hydraulic servo motor for a control valve of a turbine. 4,025,222, Cl. 415-43.000.
Hegbar, Howard R.: *See—*
Arnold, John B.; Bowyer, John M.; Hegbar, Howard R.; and Shaefer, Archie B., 4,025,916.
Hehl, Karl. Die closing unit with retractable tie rods. 4,025,264, Cl. 425-190.000.
Heidelberger Druckmaschinen Aktiengesellschaft: *See—*
Becker, Willi, 4,024,814.
Jahn, Hans-Georg, 4,024,812.
Heiderer, Conrad Elmer, to United States of America, Army. Bore gas evacuation device for cannons and guns. 4,024,790, Cl. 89-1.00E.
Heilweil, Israel Joel: *See—*
Nnadi, John C.; and Heilweil, Israel Joel, 4,025,452.
Heim Universal Corporation: *See—*
McCloskey, Albert R., 4,024,616.
Heisele, Horst: *See—*
Hendrischk, Wolfgang; Ott, Hubert; Seybold, Wolfgang; Heisele, Horst; and Mayr, Karl, 4,024,940.
Heiss, Lorenz; and Uhl, Klaus, to Hoechst Aktiengesellschaft. Process for the preparation of 1,4-naphthodinitrile. 4,025,543, Cl. 260-465.00H.
Hell, August: *See—*
Bartel, Siegfried; and Hell, August, 4,025,025.
Heller, Harold: *See—*
Corte, Herbert; Heller, Harold; Lange, Michael; and Netz, Otto, 4,025,705.
Heller, Rudolf, to Contraves AG. Apparatus for the continuous fabrication of fiber reinforced plastic profile members. 4,025,256, Cl. 425-114.000.
Hellmuth, Walter W.; and Miller, Edward F., to Texaco Inc. Boron amide lubricating oil additive. 4,025,445, Cl. 252-49.600.
Hellstrom, Nils-Erik; and Berg, Bengt Artur, to AB Hammars Meka-

niska Verkstad. Device for stacking pieces of board or lumber. 4,024,964, Cl. 214-6.0DK.
Henderson, Dewey D.: *See*—
Hartman, Russell E.; and Henderson, Dewey D., 4,024,773.
Henderson, Eulas W., to Phillips Petroleum Company. Apparatus for making carbon black. 4,025,312, Cl. 23-259.500.
Hendrischk, Wolfgang; Ott, Hubert; Seybold, Wolfgang; Heisele, Horst; and Mayr, Karl, to Mannesmann Aktiengesellschaft. Matrix printer having document thickness compensating device. 4,024,940, Cl. 197-1.00R.
Henke, Albert E., to Flexible Steel Lacing Company. Flexible hinge pin. 4,024,605, Cl. 24-33.00P.
Henningsen Foods, Inc.: *See*—
Bergquist, Dwight H.; and Lorimor, Gary D., 4,025,131.
Henry, George C.: *See*—
Kaufman, Phillip A.; Gorman, Kenneth C.; Henry, George C.; and Blacksher, Roy, 4,025,903.
Hensel, Paul E., Jr. Vehicle body including rustproofing means. 4,025,101, Cl. 296-1.00R.
Herbert Terry & Sons Limited: *See*—
Haynes, Ronald, 4,024,609.
Hespe, Hans: *See*—
Binsack, Rudolf; Bottenbruch, Ludwig; and Hespe, Hans, 4,025,492.
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Hewlett-Packard Company: *See*—
Scheu, Friedrich; and Weberg, Glenn W., 4,024,835.
Hi-Speed Checkweigher Co., Inc.: *See*—
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Dunwell, David William; Evans, Delme; and Hicks, Terence Alan, 4,025,637.
Higuchi, Hobart Atsushi; and Trubell, Lawrence Paul, to International Business Machines Corporation. Regulating electric power circuit arrangement. 4,025,863, Cl. 321-18.000.
Hiles, Phillip L. Vehicle and camper assembly. 4,025,102, Cl. 296-23.0MC.
Hillman, Malvin Jason: *See*—
Gschwend, Heinz Werner; and Hillman, Malvin Jason, 4,025,505.
Hinderks, Mitja Victor. Brake and vehicle braking system. 4,024,933, Cl. 188-77.00R.
Hintze, William; and Hansen, Niels Junior, to AMP Incorporated. Illuminated display system and method of wiring said system. 4,025,896, Cl. 240-8.160.
Hiraishi, Kiyoto: *See*—
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Hirose, Katsumi: *See*—
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Hirsch, Charles: *See*—
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Hirsch, John L.; and Radzins, Edmund A., to Curt G. Joa, Inc. Method for applying adhesive tapes to pads. 4,025,373, Cl. 156-66.000.
Hirschfeld, Tomas, to Block Engineering, Inc. System for detecting growth in microorganisms. 4,025,393, Cl. 195-103.50M.
Hishida, Tadashi, to Wada Seiko Kabushiki Kaisha (Wada Seiko Co., Ltd.). Bearing assembly. 4,025,135, Cl. 308-194.000.
Hitachi Chemical Company, Ltd.: *See*—
Tsukada, Katsushige; Isobe, Asao; Ishimaru, Toshiaki; Hayashi, Nobuyuki; and Abo, Masahiro, 4,025,348.
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Hives, Ronald, to Newage Kitchens Limited. Knockdown interlocking connectors. 4,025,216, Cl. 403-381.000.
Hlinsky, Emil J.; and Siblik, Allen D., to MacLean-Fogg Lock Nut Company. Lateral and longitudinal adjustable stowable choking system. 4,024,820, Cl. 105-368.00R.
Hoashi, Kenzo: *See*—
Takada, Hiroshi; and Hoashi, Kenzo, 4,024,721.
Hobbs, Gerald E., to Textron, Inc. Writing implement. 4,025,204, Cl. 401-109.000.
Hobson, Lloyd L. Lift truck apparatus. 4,024,972, Cl. 214-650.00R.
Hochtemperatur-Reactorbau GmbH: *See*—
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Hodge, Norman J., to Caterpillar Tractor Co. Detent release means for loader bucket positioners. 4,024,974, Cl. 214-762.000.
Hodges, Kenneth M. Tennis ball server and court installation. 4,025,071, Cl. 273-29.00A.
Hodges, Lee R. Apparatus for dispensing a bonding agent. 4,025,033, Cl. 228-33.000.
Hodges, Leon R. Mini-dome basketball game. 4,025,074, Cl. 273-101.000.
Hodgetts, Ernest J., to Molson Companies Limited, The. Keg orienting and transferring apparatus. 4,024,621, Cl. 29-822.000.
Hodson, Harold Francis; and Batchelor, John Frederick, to Burrougha Wellcome Co. Cyclic sulphur compounds. 4,025,635, Cl. 424-269.000.
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Hoerner, Eugen. Three dimensional character. 4,024,658, Cl. 40-130.00D.
Hoffman, Kenneth F.: *See*—
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Burri, Kaspar F.; Kienzle, Frank; and Rosen, Perry, 4,025,584.
Rosenberger, Michael, 4,025,564.
Hofmann, Rudolf, Jr., to Sullair Corporation. Temperature responsive multi-function valve. 4,024,909, Cl. 165-35.000.
Hogan, John P., to Phillips Petroleum Company. Mixed hydrocarbyloxide treated catalyst activated at different temperatures. 4,025,707, Cl. 526-105.000.
Hokuetsu Kogyo Co., Ltd.: *See*—
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Holman, David James; and James, Howard, to United Kingdom Atomic Energy Authority. Method and apparatus for monitoring low concentrations of ions in a flowing fluid. 4,025,308, Cl. 23-230.00R.
Holmes, Ervine Stout: *See*—
Anderson, Richard Alan; Davis, Karl Gardner; and Holmes, Ervine Stout, 4,025,321.
Holmgren, Robert E., to H. H. Robertson Company. Pre-notched building panel with splice plate and method of preparing the same. 4,024,684, Cl. 52-127.000.
Hom-Ma, Yoshio; and Kaji, Tadao, to Hitachi, Ltd. Fabricating semiconductor device utilizing a physical ion etching process. 4,025,411, Cl. 204-192.00E.
Honda, Hiroshi: *See*—
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Honeywell Inc.: *See*—
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Takimoto, Masaaki; and Honjo, Satoru, 4,025,340.
Hoots, Robert G. Fuel atomizing device. 4,024,849, Cl. 123-141.000.
Horie, Kiyoshi, to Rank Xerox Ltd. Developer liquid supplying device. 4,024,838, Cl. 118-661.000.
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Horino, Shigeo, to Tokyo Shibaura Electric Co., Ltd. Thin-sheet-sorting apparatus. 4,025,420, Cl. 209-74.00R.

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Horn, Lawrence A.; and Carncross, Clayton J., to Liberty Combustion Corporation. Pilot burner reignition system. 4,025,284, Cl. 431-80.000.
Horne, Frederick F.; and Vanderlans, Gerald G., to Airrigation Engineering Company, Inc. Method and apparatus for injecting foam into a pipeline, including an inflatable plug. 4,025,360, Cl. 134-24.000.
Horton, Edward E., to Deep Oil Technology, Inc. Means and method for making a flowline connection to a subsea connector means. 4,024,724, Cl. 61-110.000.
Hosoda, Taisei: *See—*
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Hossenfelder, Klaus, to Glasurit Werke M. Winkelmann AG. Method of weatherproof caulking for the outer surfaces of iron and steel. 4,025,672, Cl. 427-388.00C.
Hou, Shou L.; Beasley, James D.; and Koneval, Donald J., to Gould Inc. Unitary ink jet and reservoir. 4,025,928, Cl. 346-140.00A.
Houck, Theodore B., to Parker Drilling Company, Inc. Drilling rig with independent table structure. 4,024,924, Cl. 173-151.000.
Hovan, Edward John, to United Technologies Corporation. Air cooled turbine vane. 4,025,226, Cl. 415-115.000.
Howe, Harald; and Goldner, Klaus. Apparatus for the production of prefabricated building components such as wall elements, room cells or the like clad with ceramic plates. 4,025,259, Cl. 425-123.000.
Howett, Michael John: *See—*
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Howlett, Donald E., to Hamilton Company. Syringe. 4,024,865, Cl. 128-218.0PA.
Hrodey, Thomas E.: *See—*
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Hu, Shengen, to Monsanto Company. Cross-linked ethylene maleic anhydride interpolymers. 4,025,482, Cl. 260-29.60T.
Huang, Kwang-Ta: *See—*
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Hubele, Adolf, to Ciba-Geigy Corporation. Haloacylanilides and use as fungicides. 4,025,648, Cl. 424-309.000.
Huber, John Henry; and Shannon, Suel Grant, to AMP Incorporated. Cover for use with a ribbon coaxial cable connector. 4,025,142, Cl. 339-128.000.
Hudson, Bobette Margaret: *See—*
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Hudson, David H., to Xerox Corporation. Passive cross mixing system. 4,025,179, Cl. 355-3.0DD.
Hudson, Perry D. Combustion in combustion products pressure generator intermittent burner type and engines. 4,024,703, Cl. 60-39.030.
Hudson, Perry D. Combustion products pressure generator continuous burner type and engines. 4,024,704, Cl. 60-39.250.
Hudson, Perry David. Combustion products pressure generators continuous burner type and engines. 4,024,702, Cl. 60-39.270.
Hudson, Perry David. Extended insulated hot head piston with extended insulated hot cylinder walls. 4,024,801, Cl. 92-86.500.
Hudson, William David; and Hudson, Bobette Margaret. Folding aluminum rice and irrigation box. 4,024,717, Cl. 61-29.000.
Huebner, William S.: *See—*
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Huemmer, Thomas F.; and Edison, Bruce A., to O'Brien Corporation, The. Radiation curable oligomers. 4,025,548, Cl. 260-486.00B.
Huff, Michaleen: *See—*
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Berry, Robert L.; and Dehne, Axel G., 4,024,727.
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Leupp, Alex M.; Lipton, Lewis T.; and Dill, Hans G., 4,024,626.
Lynch, David D., Jr.; and Tower, Lee W., 4,025,771.
Hughes, Marshall. Exposure control system for photographic copying. 4,025,190, Cl. 355-68.000.
Hughes, W. Taliaferro; and Barrett, Stewart P., Jr. Two to three-wire converter circuit. 4,025,822, Cl. 361-45.000.
Hultzsch, Kurt: *See—*
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Humphrey, Thomas D.; and Humphrey, John H., to Murli Advani. Tone analysis system with visual display. 4,024,789, Cl. 84-477.00R.
Hunke, Friedrich, to Automatik Apparate-Maschinebau H. Hench GmbH. Granulating apparatus, especially for strands of thermoplastic materials. 4,025,252, Cl. 425-67.000.
Hunnicutt, Wayne E.: *See—*
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Hunt, William E., Jr.; Connin, John L.; and Steelman, Douglas J., to Eastman Kodak Company. Web indicia for synchronizing control apparatus for electrophotographic apparatus utilizing digital computer. 4,025,186, Cl. 355-14.000.
Husselmann, Wilhelm. Apparatus for improving the operation of oil-fired boilers. 4,025,286, Cl. 431-171.000.
Hutchins, Thomas B. Opposite-sides object inspection system. 4,025,198, Cl. 356-163.000.
Hutchinson, Florence M., executrix: *See—*
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Hutchinson, William Milton, deceased; and by Hutchinson, Florence M., executrix, to Phillips Petroleum Company. Purification of fluorinated ethers. 4,025,567, Cl. 260-616.000.
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I.C.S. Ignition Control Systems Ltd.: *See—*
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Ingerdahl, John, 4,024,659.
ICI Australia Limited: *See—*
Keith, Donald George, 4,025,599.
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Igich, Victor. Self-sealing humidifier for inhalation therapy. 4,025,590, Cl. 261-122.000.
Iinoya, Koichi; Masuda, Hiroaki; and Watanabe, Kinnosuke, to Sankyo Dengyo Co. Ltd. Powder feeding apparatus and method. 4,024,985, Cl. 222-1.000.
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Kurita, Takaji; Utsumi, Tetsuya; Ikeda, Hiroshi; Komura, Masaru; Miyata, Shin; Kawai, Yoshihisa; and Arai, Kenichi, 4,025,180.
Ikeda, Yoshitsugi, to Olympus Optical Co., Ltd. Telephoto-type zoom lens system. 4,025,167, Cl. 350-184.000.
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Imai, Tetsu; and Ikeuchi, Kazuo, to Hitachi, Ltd. Turbomachine rotor assembly. 4,025,232, Cl. 416-191.000.
Imai, Toshihiro, to Olympus Optical Co., Ltd. Image-transmitting optical system. 4,025,155, Cl. 350-45.000.
Imamiya, Tamotu: *See—*
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Inductotherm Corporation: *See—*
Kennedy, Theodore R., 4,025,864.
Ingerdahl, John, to I/S Biodan. Adjustable picture frame. 4,024,659, Cl. 40-155.000.
Inglis, Sydney David, to James N. Kirby Limited. Drawing in tool. 4,024,632, Cl. 29-736.000.
Inoue, Fumihito; Nakajima, Yoshiji; and Horie, Noboru, to Hitachi, Ltd. Capacitance circuit. 4,025,802, Cl. 307-350.000.
Inoue, Michihiro: *See—*
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Brickman, Norman Frederick; and Logue, Joseph Carl, 4,025,909.
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International Paint Co., Ltd., The: *See—*
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Irissou, Pierre-Regis Marie, to Advanced Technology Applications Corporation (ATAC). Device for the mechanical filtering of the movement transmitted by a step motor. 4,024,732, Cl. 64-27.0CT.
Irle Deuz GmbH: *See—*
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Ishioka, Yoshiji; and Kawamura, Jyuro, to Shibuya Kogyo Company, Ltd. Washing device for rotary filling machine. 4,024,896, Cl. 141-90.000.
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Isobe, Masao, to Daiwa Jidosha Kogyo Kabushiki Kaisha. Mutually counterbalancing upper and lower flap doors of wide doorway. 4,024,671, Cl. 49-104.000.
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Jackman, Robert M.; and McDonald, William N., to A. O. Smith-Inland, Inc. Pipe proof test fixture. 4,024,893, Cl. 138-89.000.
Jackson, Fred, to British Nuclear Fuels Limited. Shutting down gas cooled nuclear reactors. 4,025,388, Cl. 176-86.00R.
Jackson, Jack M. Clay-free wellbore fluid. 4,025,443, Cl. 252-8.50A.
Jacobs, James Paul. Sway stabilizer for trailing vehicles. 4,025,085, Cl. 280-446.00B.
Jacobsen, Arnold Ralph; and Jaffe, I. Pompe, to Skyhook Sales Corporation. Ceiling fixture and hanging clamp assembly. 4,025,019, Cl. 248-317.000.
Jacobson, Arnold N. Electrical terminal connector. 4,025,152, Cl. 339-246.000.
Jacobson, Sava. Speaker telephone. 4,025,728, Cl. 179-81.00B.
Jacyno, Henry, to Singer Company, The. Evaporator pressure regulator. 4,024,888, Cl. 137-514.000.
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Keizer, Alan S.; Strube, Hans; and Stewart, Harold, 4,025,750.
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Jahn, Hans-Georg, to Heidelberger Druckmaschinen Aktiengesellschaft. Removable numbering and imprinting device for sheet-fed offset machines. 4,024,812, Cl. 101-76.000.
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Jamison, Billy H. A-frame building. 4,024,682, Cl. 52-90.000.
Janner, Karl; and Gregorius, Klaus, to Kraftwerk Union Aktiengesellschaft. Separation of mixtures of gaseous isotopes. 4,025,787, Cl. 250-251.000.
Jansen, George, Jr.: *See—*
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Jansen-Herfeld, Rottger, to W. F. Meyers Company, Inc. Spiral saw blade. 4,024,785, Cl. 83-848.000.
Janssen, Rainer; and Weber, Bernhard G., to Allo Pro A.G. Artificial joints with magnetic attraction or repulsion. 4,024,588, Cl. 3-1.910.
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Jawara, Kinya: *See—*
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Jefferies, Larry D.; and Gilmour, George A., to Westinghouse Electric Corporation. Automatic target detector. 4,025,919, Cl. 343-5.0VQ.
Jelenko, Carl, III. Non-steroid topical agent for alleviating inflammation in mammals. 4,025,645, Cl. 424-312.000.
Jensen, Donald Frederick; Lee, Ho Chong; and Tamulis, John Carl, to International Business Machines Corporation. Multi-nozzle ink jet printer and method of printing. 4,025,925, Cl. 346-75.000.
Jet Research Center, Inc.: *See—*
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Jetter, Heinz Leonhard; Gurs, Karl; and Englisch, Wolfgang, to URANIT Uran-Isotopentrennungs-GmbH. Method for separating isotopes by means of lasers. 4,025,790, Cl. 250-284.000.
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Razdan, Raj Kumar; and Dalzell, Haldean Cloyce, 4,025,516.
John Zink Company: *See—*
Reed, Robert D.; and Goodnight, Hershel, 4,025,282.
Johns-Manville Corporation: *See—*
Botsolas, Christos John; and Kostecki, Ronald, 4,025,680.
Fineo, Carlo, 4,025,009.
Johnson, Bradley V.: *See—*
Roepke, Wallace W.; Strebig, Kelly C.; and Johnson, Bradley V., 4,025,116.
Johnson, Carl B., to Pontiac Furniture Industries, Inc. Shaft assembly. 4,025,210, Cl. 403-240.000.
Johnson, Clifford C.; and Eitzen, Vincent E., to American Hospital Supply Corporation. Timing apparatus including electronic calculator circuits. 4,025,774, Cl. 235-168.000.
Johnson, Curtiss S., Jr., to C. Sherman Johnson Company, Inc. Positive locking turnbuckle. 4,025,207, Cl. 403-46.000.
Johnson, Howard L., to Caterpillar Tractor Co. Spring centered balanced resolver valve. 4,024,797, Cl. 91-412.000.
Johnson & Johnson: *See—*
Mesek, Frederick K., 4,024,867.
Zorovich, Dan, 4,024,642.
Johnson, Kenneth C., to F. J. Littell Machine Company. Modular cam driven roll feed. 4,024,774, Cl. 74-606.00R.
Johnson, Marvin M.: *See—*
Tabler, Donald C.; and Johnson, Marvin M., 4,025,574.
Johnson Matthey & Co., Limited: *See—*
Acres, Gary James Keith, 4,025,606.
Johnson, Olin B., to Ford Motor Company. Method for continuous hydrolysis of polyurethane foam in restricted tubular reaction zone and recovery. 4,025,559, Cl. 260-578.000.
Johnson, Ralph G.: *See—*
Barr, Jack R.; Hrodey, Thomas E.; and Johnson, Ralph G., 4,025,086.
Johnstone, Richard T.; Montag, Alfred C.; Franklin, Charles H.; and Vinton, Clarence S., to Surftran Company. Thermal deburring unit. 4,025,062, Cl. 266-251.000.
Joly, Jean; and Ranger, Jean Bernard, to Societe Lignes Telegraphiques et Telephoniques. Ohmic contacts to thin film circuits. 4,025,404, Cl. 204-38.00B.
Jonason, Karl Gunnar, to Granges Essem Aktiebolag. Method of manufacturing a flat heat-exchanger tube from thin, flexible metal strip material. 4,024,619, Cl. 29-157.30R.
Jonason, Karl Gunnar, to Granges Essem Aktiebolag. Method of affixing surface enlarging members in the form of coherent, transversally corrugated metal strips to elongate metal basic profiles. 4,025,035, Cl. 228-185.000.
Jonda, Wolfgang, to Messerschmitt-Bolkow-Blohm GmbH. Reinforced laminates. 4,025,675, Cl. 428-36.000.
Jones, Charles H.: *See—*
Coltman, John W.; and Jones, Charles H., 4,025,805.
Jones, Daniel Lee: *See—*
Marth, Gerald A.; Hunnicutt, Wayne E.; and Jones, Daniel Lee, 4,024,965.
Jones, Emory E., III, to Pyott-Boone, Inc. Electronic slip detector circuit. 4,025,832, Cl. 318-317.000.
Jordan, Kenneth Albert, to Trip-Lite Ltd. Yarn fault detectors. 4,024,734, Cl. 66-158.000.
Joseph, Beresford Clair. Variable speed ratio drive mechanism. 4,024,771, Cl. 74-198.000.
Jourquin, Lucien; and Du Prez, Eddie, to S.A. PRB. Process for preparing polyurethane foam and foam so obtained. 4,025,466, Cl. 260-2.5AC.
Judd, James Hewitt; and Manganello, Joseph Charles, to Bell Telephone Laboratories, Incorporated. Fuse and visual indicator mounting apparatus. 4,025,888, Cl. 337-266.000.
Jung, Albert; Reese, Johannes; Hultzsch, Kurt; and Hesse, Wolfgang, to Hoechst Aktiengesellschaft. Removal of sulfuric acid compounds. 4,025,479, Cl. 260-27.0BB.
Jureit, John Calvin; Castillo, Adolfo; Leutwyler, Roy; Kushner, Benjamin H.; and Brodsky, Larry, to Automated Building Components, Inc. Box spring frame machine. 4,025,028, Cl. 227-7.000.
Jurrens, Lawrence D., to Phillips Petroleum Company. Hot melt adhesive. 4,025,478, Cl. 260-27.00R.
K. D. G. Instruments Limited: *See—*
Giles, Donald Beresford, 4,024,645.
Kabushiki Kaisha Daikin Seisakusho: *See—*
Shibata, Masahiro, 4,024,934.
Kabushiki Kaisha Daini Seikosha: *See—*
Yagi, Kenjiro, 4,025,162.
Kabushiki Kaisha Komatsu Seisakusho: *See—*
Sugimoto, Yutaka, 4,024,935.

Takada, Hiroshi; and Hoashi, Kenzo, 4,024,721.
Kabushiki Kaisha Shikutani: *See*—
Mizuno, Hitoshi; and Akiyama, Satoshi, 4,024,635.
Kabushiki Kaisha Suwa Seikosha: *See*—
Yamamura, Katsumi, 4,024,676.
Kabushiki Kaisha Teranishi Denki Seisakusho: *See*—
Teranishi, Akihiko, 4,025,809.
Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See*—
Kawauchi, Yoshikazu; and Honda, Hiroshi, 4,025,003.
Kabushiki Kaisha Toyota Chuo Kenkyusho: *See*—
Masaki, Hideyuki, 4,025,351.
Kaeser, Robert E., to LCA Corporation. Pole and device for raising and lowering lighting fixtures thereon. 4,025,782, Cl. 240-64.000.
Kaji, Tadao: *See*—
Hom-Ma, Yoshio; and Kaji, Tadao, 4,025,411.
Kamada, Kensuke; and Minami, Shunsuke, to Mitsubishi Rayon Co., Ltd. Dried semipermeable membrane and manufacture thereof. 4,025,439, Cl. 210-500.00M.
Kameda, Naomi: *See*—
Bolz, Gunner; Deindoerfer, Fred H.; Gifford, Charles R.; and Kameda, Naomi, 4,025,310.
Kameda, Nobuyuki: *See*—
Kirino, Osamu; Ooishi, Tadashi; Kameda, Nobuyuki; Kato, Toshiro; Ozaki, Toshiaki; and Fujinami, Akira, 4,025,651.
Kamejima, Kohji: *See*—
Uchida, Motokazu; Hosoda, Taisei; Uzuhashi, Hideo; Kamejima, Kohji; and Kano, Minoru, 4,024,725.
Kaminow, Ivan Paul: *See*—
Gloge, Detlef Christoph; Kaminow, Ivan Paul; and Presby, Herman Melvin, 4,025,156.
Kampf, Richard S., to Beckman Instruments, Inc. Set point adjust mechanism for process controllers. 4,024,767, Cl. 73-432.00A.
Kanda, Yozo; Maki, Michiyoshi; Migitaka, Masatoshi; and Sato, Kikuji, to Hitachi, Ltd. Hall element. 4,025,941, Cl. 357-27.000.
Kaniut, Herbert. Shifting horizontal tail with helical motions. 4,025,007, Cl. 244-15.000.
Kano, Minoru: *See*—
Uchida, Motokazu; Hosoda, Taisei; Uzuhashi, Hideo; Kamejima, Kohji; and Kano, Minoru, 4,024,725.
Kao Soap Co., Ltd.: *See*—
Fujikura, Yoshiaki; Inamoto, Yoshiaki; Ikeda, Hiroshi; and Takaishi, Naotake, 4,025,568.
Matsunaga, Kinjiro, 4,025,609.
Kapps, Manfred: *See*—
Andres, Karlheinz; Wagner, Kuno; Hoffmann, Erwin; and Kappa, Manfred, 4,025,470.
Karlberger, Walter Johann, to Morgardshammar Aktiebolag. Rod cooling and coiling system. 4,024,745, Cl. 72-201.000.
Karp, Joel Allen; and Reed, John Anthony, to Burroughs Corporation. Interlaced memory matrix array having single transistor cells. 4,025,907, Cl. 340-173.0CA.
Karron, Leo. Method and apparatus for recording. 4,025,722, Cl. 179-1.00P.
Karsen, Douglas E., to Weldun International, Inc. Press. 4,024,807, Cl. 100-53.000.
Kasamatsu, Tadashi: *See*—
Uemura, Masaru; Kasamatsu, Tadashi; Akiyama, Toshimitsu; Kuroki, Hitoshi; and Kosaka, Yujiro, 4,025,274.
Kast, Philip J.: *See*—
Thomson, Ronald E.; and Kast, Philip J., 4,024,930.
Kastan, Howard, to Lockheed Aircraft Corporation. Advanced control system for a rotor and/or a compound or rotary wing vehicle. 4,025,230, Cl. 416-18.000.
Kastelic, Raymond: *See*—
Racunas, Bernard J.; Kastelic, Raymond; Proctor, William L., Jr.; and Moretz, George E., 4,025,287.
Kasubuchi, Takeshi: *See*—
Fujimoto, Isao; Kasubuchi, Takeshi; and Aiba, Masahiko, 4,025,926.
Katada, Hirosi: *See*—
Naito, Shotaro; and Katada, Hirosi, 4,025,836.
Kato, Minoru: *See*—
Fujii, Hideo; and Kato, Minoru, 4,024,844.
Kato, Toshiro: *See*—
Kirino, Osamu; Ooishi, Tadashi; Kameda, Nobuyuki; Kato, Toshiro; Ozaki, Toshiaki; and Fujinami, Akira, 4,025,651.
Katou, Kazuo: *See*—
Nihashi, Yoshiyuki; Horinaka, Ikuho; Senda, Syuichi; Katou, Kazuo; and Sase, Takashi, 4,025,849.
Katz, Sheldon N.: *See*—
Collins, David R.; and Katz, Sheldon N., 4,024,690.
Kauffman, William J., to Armstrong Cork Company. Novel catalyst system for trimerization organic isocyanates. 4,025,469, Cl. 260-2.5AW.
Kaufhold, Horst Thomas, to Amsted Industries Incorporated. Coupler knuckle contour. 4,024,958, Cl. 213-152.000.
Kaufman, Nathan. Sliding glass door lock. 4,024,739, Cl. 70-97.000.
Kaufman, Paul. Centrifugal switches. 4,025,745, Cl. 200-80.00A.
Kaufman, Phillip A.; Gorman, Kenneth C.; Henry, George C.; and Blacksher, Roy, to Computer Automation, Inc. Automatic modular memory address allocation system. 4,025,903, Cl. 340-172.500.
Kawabe, Hidehiko: *See*—
Shibata, Tsuneo; Maki, Masao; Suzuki, Masao; and Kawabe, Hidehiko, 4,025,603.
Kawade, Sadao: *See*—
Nakao, Hisaji; Naruse, Katutoshi; Hasegawa, Kazuhiko; Kawade, Sadao; Tokura, Yasufumi; and Matsuno, Kazuo, 4,025,902.
Kawai, Yoshihisa: *See*—
Kurita, Takaji; Utsumi, Tetsuya; Ikeda, Hiroshi; Komura, Masaru; Miyata, Shin; Kawai, Yoshihisa; and Arai, Kenichi, 4,025,180.
Kawaji, Noboru, to Copal Company Limited. Printer with a paper guide separate from the printer frame. 4,024,942, Cl. 197-127.00R.
Kawaken Fine Chemicals Co., Ltd.: *See*—
Takayama, Hirohide; and Yoshimura, Ippei, 4,025,525.
Kawamura, Jyuro: *See*—
Ishioka, Yoshiji; and Kawamura, Jyuro, 4,024,896.
Kawamura, Naoto, to Canon Kabushiki Kaisha. Retro-focus type wide angle objective lens. 4,025,170, Cl. 350-214.000.
Kawasaki Heavy Industries, Ltd.: *See*—
Watanabe, Takehiko, 4,025,838.
Kawasaki Steel Corporation: *See*—
Sanbongi, Koji; Funakoshi, Tokushi; Tanaka, Tomoo; and Ueda, Syuzo, 4,025,368.
Kawashima, Koji; and Umeda, Keiji, to Director of National Food Research Institute. Preparation of bead-shaped immobilized enzyme. 4,025,391, Cl. 195-68.000.
Kawauchi, Yoshikazu; and Honda, Hiroshi, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Device for simultaneously traversing thread guides of a winding apparatus for taking up a plurality of threads. 4,025,003, Cl. 242-43.00R.
Kedzior, Edward S.: *See*—
Spurr, Eugene V.; and Kedzior, Edward S., 4,025,749.
Keith, Donald George, to ICI Australia Limited. Cuspated sheet forming. 4,025,599, Cl. 264-167.000.
Keith, Donald George, to ICI Australia Limited. Process of drawing a shaped plastic shoe having hollow pointed projections. 4,025,601, Cl. 264-291.000.
Keizer, Alan S.; Strube, Hans; and Stewart, Harold, to Jade Corporation, The. Compliant electrode. 4,025,750, Cl. 219-119.000.
Keller, Richard A.: *See*—
Lamotte, Michel; Dewey, Harry J.; Keller, Richard A.; and Ritter, Joseph J., 4,025,406.
Kenall Manufacturing Company: *See*—
Krase, Kenneth P.; and Hawkins, Kenneth R., 4,025,780.
Kendall Company, The: *See*—
Collins, Robert F., 4,024,862.
Kennedy, Theodore R., to Inductotherm Corporation. Direct current modulator for providing variable double frequency electrical power to a load. 4,025,864, Cl. 321-68.000.
Kenney, Donald Sykes: *See*—
Crovetti, Aldo Joseph; Kenney, Donald Sykes; Lynch, Don Murl; and Stein, Robert George, 4,025,530.
Kerb, Ulrich: *See*—
Nickolson, Robert C.; Kerb, Ulrich; and Wiechert, Rudolf, 4,025,563.
Kevi A/S: *See*—
Harlang, Bent, 4,024,601.
Kido, Keishiro; and Arai, Noboru, to Fuji Photo Film Co., Ltd. Method of preparing bleached phase hologram and a bleaching solution composition therefor. 4,025,345, Cl. 96-60.00R.
Kienzle, Frank: *See*—
Burri, Kaspar F.; Kienzle, Frank; and Rosen, Perry, 4,025,584.
Kikuchi, Katsutoshi: *See*—
Tomita, Tadayoshi; Kikuchi, Katsutoshi; and Sakamoto, Takayuki, 4,025,457.
Kilian, Heinz, to Irle Deuz GmbH. Fixing clamp for laying wall tiles. 4,024,683, Cl. 52-98.000.
Kilo Corporation: *See*—
Lennington, John W.; and Sternberg, Stanley R., 4,025,791.
Kimura, Takeji; Inoue, Michihiro; Sato, Masaharu; and Horiuchi, Shiro, to Matsushita Electric Industrial Co., Ltd. MOS type semiconductor device. 4,025,940, Cl. 357-23.000.
King, Jerry A., to United Technologies Corporation. Apparatus for making metal powder. 4,025,249, Cl. 425-6.000.
King, William B.: *See*—
United States of America, National Aeronautics and Space Administration; and King, William B., 4,025,783.
Kingsbury, William D.: *See*—
Gyurik, Robert J.; and Kingsbury, William D., 4,025,638.
Kinjo, Ayako, legal successor: *See*—
Matsumoto, Masakazu; Nishide, Katsuhiko; Shimosawa, Akemi; and Kinjo, Kikuo, deceased, 4,025,399.
Kinjo, Kikuo, deceased: *See*—
Matsumoto, Masakazu; Nishide, Katsuhiko; Shimosawa, Akemi; and Kinjo, Kikuo, deceased, 4,025,399.
Kirayoglu, Birol: *See*—
Contractor, Rashmikant Maganlal; and Kirayoglu, Birol, 4,024,612.
Kirch, John Nicholas: *See*—
Petke, Frederick Edward; Kirch, John Nicholas; and Gerkin, Michael Edward, 4,025,346.
Kirianoff, Timofey Gregory. Method and apparatus for measuring the volume of asymmetrical breasts. 4,024,856, Cl. 128-2.00S.
Kirino, Osamu; Ooishi, Tadashi; Kameda, Nobuyuki; Kato, Toshiro; Ozaki, Toshiaki; and Fujinami, Akira, to Sumitomo Chemical Company, Limited. N-substituted-aminoacetamides used as fungicides. 4,025,651, Cl. 424-320.000.
Kisuna, Keiichi; and Akamatsu, Yasuyoshi, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Shift-time indicating system. 4,025,897, Cl. 340-52.00R.

Kit, Harry John: *See—*
Greenberg, Paul Burton; and Kit, Harry John, 4,025,227.

Kitamura, Keiji; and Furutuki, Yasuko. Self-standing or phone mounted calendar. 4,024,661, Cl. 40-337.000.

Kittle, Keith B., to Halle Industries Inc. Progressive slide assemblies. 4,025,138, Cl. 312-334.000.

Kiuchi, Tadashi; Hiraishi, Kiyoto; and Taneda, Motoharu, to Hitachi, Ltd. Tank for use with electric equipment. 4,024,978, Cl. 220-5.00A.

Kizler, Harald: *See—*
Schmidt, Peter Jurgen; and Kizler, Harald, 4,024,707.

Klar, Irwin; and Rock, Erwin H., to American Electromedics Corporation. Pressure seal headband. 4,025,733, Cl. 179-156.00R.

Klaue, Hermann. Disk brake assembly for vehicles. 4,024,931, Cl. 188-18.00A.

Kleemann, Axel; Kolb, Heinz; Rindfuss, Anne; Schreyer, Gerd; Schworzer, Ludwig-Karl; and Schuster, Gregor, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for the production of pure carboxylic acid-1-monoglycerides. 4,025,540, Cl. 260-410.700.

Kleiss, Louis D., to Phillips Petroleum Company. Process control including simulating a derivative. 4,025,763, Cl. 235-150.100.

Klessig, Clarence Edward, to Kohler Co. Siphon flush valve. 4,024,589, Cl. 4-42.000.

Kleysteuber, William K.; and Peterson, William J., Jr., to United States of America, Interior. Traverse bendable endless belt conveyor. 4,024,949, Cl. 198-818.000.

Kleysteuber, William K.; and Bean, Ernest H., to United States of America, Interior. High-pressure injection hydraulic transport system with a peristaltic pump conveyor. 4,025,121, Cl. 302-14.000.

Klimek, Boleslaw M.; and Mastis, Victor, to Echlin Manufacturing Company, The. Clamp. 4,024,604, Cl. 24-16.00R.

Klimentiev, Vladimir Ivanovich: *See—*
Trakhtenberg, Jury Borisovich; Oleshko, Vasily Grigorievich; Klimentiev, Vladimir Ivanovich; Zapunny, Alexandr Iosifovich; Robakovsky, Yaroslav Nikolaevich; Rossikhin, Vladimir Petrovich; and Maximuk, Boris Yakovelevich, 4,024,744.

Klingelhofer, Gerd; and Werner, Paul, to Fritz Keiper, Firma. Fitting for adjustably connecting a backrest member to a seat member. 4,025,109, Cl. 297-355.000.

Klinger, Heimut; and Glauert, Wolfram, to Robert Bosch G.m.b.H. Apparatus for measuring the flow rate of a flowing medium. 4,024,759, Cl. 73-194.00B.

Klippel, Allen Pumill, to Rescue Products, Inc. Extraction device for blocked windpipes. 4,024,874, Cl. 128-356.000.

Klockner-Humboldt-Deutz Aktiengesellschaft: *See—*
Buchner, Heinrich, 4,025,296.

Klockner-Werke AG: *See—*
Bahre, Karl; and Nowak, Hans-Dieter, 4,025,117.
Linde, Joachim; and Spath, Wolfgang, 4,025,266.

Knell, Martin: *See—*
Dexter, Martin; and Knell, Martin, 4,025,487.

Kneusel, Raymond H. P.; and Potta, Vinson S., to Crown Cork & Seal Company, Inc. Easy opening can end having a closure plug. 4,024,980, Cl. 220-260.000.

Knifton, John F., to Texaco Inc. Preparation of allyl vinylacetate esters. 4,025,547, Cl. 260-476.00R.

Knight, Edward P.; and Bailey, Watson, to Blue Bell, Inc. Tension attachment for sewing machines. 4,024,826, Cl. 112-235.000.

Kniskern, Leroy James, to Litton Systems, Inc. Shock and vibration sensitive switch. 4,025,744, Cl. 200-61.45R.

Knofel, Hartmut: *See—*
Eifler, Willi; and Knofel, Hartmut, 4,025,557.

Knoll, Frank; and Ryan, John Robert, to East/West Industries, Inc. Signaling device. 4,024,828, Cl. 116-20.000.

Knolle, Ernst G. Bulk material conveyor. 4,024,947, Cl. 198-707.000.

Kobayashi, Kazuo; Ohmori, Shiroh; Hasuda, Tetsuhiko; Shiraishi, Minoru; and Arai, Satoshi, to Agency of Industrial Science & Technology. Method for manufacture of graphitized hollow spheres and hollow spheres manufactured thereby. 4,025,689, Cl. 428-402.000.

Kobori, Takahide: *See—*
Kodama, Iehiro; Kudo, Yoshiaki; Kobori, Takahide; and Kozima, Tokue, 4,025,485.

Kochevar, Joseph F.; Rath, Richard M.; and Claffey, Walter W., to Revcor, Inc. Propeller fan construction. 4,025,231, Cl. 416-144.000.

Kodama, Iehiro; Kudo, Yoshiaki; Kobori, Takahide; and Kozima, Tokue, to Shin-Etsu Chemical Company Limited. Organopolysiloxane compositions. 4,025,485, Cl. 260-37.0SB.

Koehring Company: *See—*
Zelle, Lester L., 4,024,710.

Koellisch, Glenn M. Composite skid construction for moving heavy objects. 4,025,676, Cl. 428-40.000.

Koenig, William P.; and Ray, Robert W., Jr. Gauge for measuring the headspace in a container. 4,024,644, Cl. 33-126.70R.

Koflach Sportgerate Ges. m.b.H.: *See—*
Haizinger, Ferdinand, 4,024,594.

Koganemaru, Shunji, to Toyota Jidosha Kogyo Kabushiki Kaisha. Digital control device for recirculated flow of exhaust gas in an internal combustion engine. 4,024,847, Cl. 123-119.00A.

Kogosov, Leonid Pinkhusovich: *See—*
Naidich, Jury Vladimirovich; Lavrinenko, Irina Alexandrovna; Kondratsky, Vladimir Afanasievich; Semenov, Jury Nikolaevich; Emelyanov, Boris Mikhailovich; and Kogosov, Leonid Pinkhusovich, 4,024,675.

Kohler Co.: *See—*
Klessig, Clarence Edward, 4,024,589.

Kohler, Manfred Rudi: *See—*
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Kokusai Denshin Denwa Kabushiki Kaisha: *See—*
Wada, Tasaku; and Nakabo, Satoru, 4,025,957.

Kolar, Charles W., Jr.: *See—*
Cho, Iue Chung; and Kolar, Charles W., Jr., 4,025,659.

Kolb, Heinz: *See—*
Kleemann, Axel; Kolb, Heinz; Rindfuss, Anne; Schreyer, Gerd; Schworzer, Ludwig-Karl; and Schuster, Gregor, 4,025,540.

Kolic, Edwin S. Detachable article-mounting device. 4,025,015, Cl. 248-205.00A.

Kollmeyer, Willy D., to Shell Oil Company. Preparation of nitroketene aminals. 4,025,529, Cl. 260-309.600.

Kolpin Manufacturing, Inc.: *See—*
Kolpin, Ronald N., 4,024,997.

Kolpin, Ronald N., to Kolpin Manufacturing, Inc. Gun case including means for suspending the gun case from a support. 4,024,997, Cl. 224-2.00R.

Komura, Masaru: *See—*
Kurita, Takaji; Utsumi, Tetsuya; Ikeda, Hiroshi; Komura, Masaru; Miyata, Shin; Kawai, Yoshihisa; and Arai, Kenichi, 4,025,180.

Kondo, Hiroyuki: *See—*
Hamaguchi, Youshi; Yukami, Noboru; Tomioka, Tatsuyuki; Shimizu, Yoshihito; and Kondo, Hiroyuki, 4,025,890.

Kondratsky, Vladimir Afanasievich: *See—*
Naidich, Jury Vladimirovich; Lavrinenko, Irina Alexandrovna; Kondratsky, Vladimir Afanasievich; Semenov, Jury Nikolaevich; Emelyanov, Boris Mikhailovich; and Kogosov, Leonid Pinkhusovich, 4,024,675.

Koneval, Donald J.: *See—*
Hou, Shou L.; Beasley, James D.; and Koneval, Donald J., 4,025,928.

Koninklijke Emballage Industrie Van Leer B.V.: *See—*
Leitz, Wilfried, 4,024,952.

Konort, Mark D.: *See—*
Lamberti, Vincent; and Konort, Mark D., 4,025,450.

Koppa, James A., to International Harvester Company. Hydraulic piston and rod assembly. 4,024,802, Cl. 92-255.000.

Koppe, Herbert; Stahle, Helmut; Kummer, Werner; and Traunecker, Werner, to Boehringer Ingelheim GmbH. Pharmaceutical compositions containing a 1-(cyano-phenoxy)-2-hydroxy-3-hydroxyalkylamino-propane and method of use. 4,025,646, Cl. 424-304.000.

Koppe, Herbert: *See—*
Stahle, Helmut; Koppe, Herbert; Kummer, Werner; Stockhaus, Klaus; Hoefke, Wolfgang; and Kuhn, Franz Josef, 4,025,607.

Korte, Friedrich-Wilhelm A. G. K.; and Coulston, Frederick, to Abbott Laboratories. Tri-cyclic compounds derived from thiaphloroglucinol ethers. 4,025,536, Cl. 260-345.300.

Kosaka, Yujiro: *See—*
Uemura, Masaru; Kasamatsu, Tadashi; Akiyama, Toshimitsu; Kuroki, Hitoshi; and Kosaka, Yujiro, 4,025,274.

Kossler, Albert, to Audi NSU Auto Union Aktiengesellschaft. Process for currentless separation of a nickel layer from objects of light metal. 4,025,358, Cl. 134-3.000.

Kostecki, Ronald: *See—*
Botsolas, Christos John; and Kostecki, Ronald, 4,025,680.

Kotas, John A.; and Haupt, Eugene J., to DESA Industries, Inc. Hammer-activated powder-actuated fastening tool. 4,025,029, Cl. 227-10.000.

Kovalenko, Igor Leonidovich: *See—*
Chelnokov, Gennady Ivanovich; Ruvinsky, Leonid Gershevich; Kovalenko, Igor Leonidovich; Sokolov, Ivan Ivanovich; Belyaev, Nikolai Semenovich; Okhotsky, Vladimir Pavlovich; and Belyshev, Leonid Lavrentievich, 4,024,860.

Kowalchuk, Roman: *See—*
Bobeck, Andrew Henry; and Kowalchuk, Roman, 4,025,911.

Kozak, John. Architectural system having post-tensioned elements. 4,024,687, Cl. 52-228.000.

Kozima, Tokue: *See—*
Kodama, Iehiro; Kudo, Yoshiaki; Kobori, Takahide; and Kozima, Tokue, 4,025,485.

Kraemer, Erich H.: *See—*
Cohen, Leonard D.; Kraemer, Erich H.; and Nussbaum, Shlomo, 4,025,881.

Kraftwerk Union Aktiengesellschaft: *See—*
Janner, Karl; and Gregorius, Klaus, 4,025,787.

Krase, Kenneth P.; and Hawkins, Kenneth R., to Kenall Manufacturing Company. Fluorescent light fixture. 4,025,780, Cl. 240-51.11R.

Kraska, Allen R.; and Schnur, Rodney C., to Pfizer Inc. Aromatic amidines as antiviral agents in animals. 4,025,555, Cl. 260-564.00R.

Krassig, Johannes: *See—*
Sasshofer, Franz; Gotschy, Friedrich; Krassig, Johannes; and Wimmer, Adalbert, 4,025,598.

Kravetz, Louis; and Lutz, Eugene F., to Shell Oil Company. Activated bleaching process and compositions therefor. 4,025,453, Cl. 252-102.000.

Kreinin, Efim Vulfovich. Method of processing coal channels in underground coal gasification. 4,024,914, Cl. 166-251.000.

Kretchmer, Richard Allan; and Laitar, Robert Anton. Preparation of 3-carboalkoxy or 3-alkanoyl furans. 4,025,537, Cl. 260-347.500.

Kretschmar, Rickey: *See—*
Murphy, Alan P.; and Kretschmar, Rickey, 4,025,444.

Krieger, Josef: *See—*
Obendorf, Werner; Lindner, Irmgard; Schwarzinger, Ernst; and Krieger, Josef, 4,025,550.

Krob, Erwin; Weigl, Erwin; and Svoboda, Josef, to Gertsch AG. Safety ski binding. 4,025,087, Cl. 280-631.000.

Kron, Martin W.; and Polz, Victor I., to Eastman Kodak Company. Apparatus for cutting the trailing end of an expiring web. 4,024,782, Cl. 83-373.000.

Kronogard, Sven-Olof, to United Turbine AB and Co., Kommanditbolag. Automotive gas turbine power plant. 4,025,221, Cl. 60-39.16S.

Krulwich, Lester S. Copyholder and line follower. 4,024,662, Cl. 40-352.000.

Kubiak, John William, to Spray Tech Corporation. Nozzle guard for airless spray pistols. 4,025,045, Cl. 239-288.500.

Kubota, Takeshi: *See—*
Ueda, Mikio; Kubota, Takeshi; Nishikawa, Yasuo; and Watanabe, Akira, 4,025,460.

Kuboto Tekko Kabushiki Kaisha: *See—*
Yasuoka, Masahiro, 4,024,890.

Kuchta, Bernard R.: *See—*
Ekholm, LaVerne G.; Kuchta, Bernard R.; and McGinness, Joseph P., 4,025,395.

Kudo, Yoshiaki: *See—*
Kodama, Ichiro; Kudo, Yoshiaki; Kobori, Takahide; and Kozima, Tokue, 4,025,485.

Kuehnle, Manfred R., to Coulter Information Systems, Inc. Electrophotographic film, method of making the same and photoconductive coating used therewith. 4,025,339, Cl. 96-1.500.

Kugelfischer Georg Schafer & Co.: *See—*
Markfelder, Gunter; and Teich, Wolfgang, 4,025,129.

Kugelmann, Adolf: *See—*
Adler, Karl-Heinz; Drews, Ulrich; Gloss, Erwin; and Kugelmann, Adolf, 4,024,843.

Kuhn, Franz Josef: *See—*
Stahle, Helmut; Koppe, Herbert; Kummer, Werner; Stockhaus, Klaus; Hoefke, Wolfgang; and Kuhn, Franz Josef, 4,025,607.

Kuhn, Jurgen: *See—*
Steinmetz, Eberhard; and Kuhn, Jurgen, 4,025,059.

Kulite Semiconductor Products, Inc.: *See—*
Kurtz, Anthony D., 4,025,942.

Kull, Leo, to Coffee-Mat Corporation. Selection and timing control for beverage vending machine. 4,025,739, Cl. 200-38.00F.

Kumm, Emerson L. Variable speed flat belt transmission. 4,024,772, Cl. 74-230.160.

Kummer, Werner: *See—*
Koppe, Herbert; Stahle, Helmut; Kummer, Werner; and Traunecker, Werner, 4,025,646.
Stahle, Helmut; Koppe, Herbert; Kummer, Werner; Stockhaus, Klaus; Hoefke, Wolfgang; and Kuhn, Franz Josef, 4,025,607.

Kun, Leslie Charles, to Union Carbide Corporation. Manufacture of isostress contoured dies. 4,024,623, Cl. 29-421.00R.

Kunioka, Kazuo: *See—*
Yamada, Takeo; Kunioka, Kazuo; Sugiyama, Shunichi; and Teramoto, Toyokazu, 4,024,903.

Kuper, Donald G.: *See—*
Anderson, Kenneth L.; and Kuper, Donald G., 4,025,496.

Kuraray Co., Ltd.: *See—*
Fujita, Yoshiji; Omura, Yoshiaki; Nishida, Takashi; and Itoi, Kazuo, 4,025,539.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
Enomoto, Satoru; Takita, Hitoshi; Wada, Hisayuki; Mukaida, Yutaka; and Yanaka, Mikiro, 4,025,475.

Kurio, Noriyuki; and Ebihara, Tadashi, to Toyo Kogyo Co., Ltd.; and Nippon Piston Ring Co., Ltd. Corner seal. 4,025,247, Cl. 418-120.000.

Kurita, Takaji; Utsumi, Tetsuya; Ikeda, Hiroshi; Komura, Masaru; Miyata, Shin; Kawai, Yoshihisa; and Arai, Kenichi, to Minolta Camera Kabushiki Kaisha. Transfer type electrophotographic copying apparatus. 4,025,180, Cl. 355-3.00R.

Kurokawa, Hiromichi; Okada, Haruhiko; and Yamazaki, Masaru, to Sony Corporation. Pick-up tube having photoconductor on zinc oxide layer. 4,025,815, Cl. 313-371.000.

Kuroki, Hitoshi: *See—*
Uemura, Masaru; Kasamatsu, Tadashi; Akiyama, Toshimitsu; Kuroki, Hitoshi; and Kosaka, Yujiro, 4,025,274.

Kurtz, Anthony D., to Kulite Semiconductor Products, Inc. Low pressure transducers employing large silicon diaphragms having noncritical electrical properties. 4,025,942, Cl. 357-26.000.

Kushner, Benjamin H.: *See—*
Jureit, John Calvin; Castillo, Adolfo; Leutwyler, Roy; Kushner, Benjamin H.; and Brodsky, Larry, 4,025,028.

Kuszynski, Gregory G.: *See—*
Tanaka, Akira; and Kuszynski, Gregory G., 4,025,111.

Kyma Corporation: *See—*
Djorup, Robert S., 4,024,761.

Kyrias, Gilbert M., to FMC Corporation. Method of fabricating gas transmitting body for use in bubble shearing. 4,024,618, Cl. 29-157.00C.

Kyte, Eric, to Bulldog Toy Company Limited. Collapsible chair. 4,025,106, Cl. 297-16.000.

Kyushu Taika Renga Kabushiki Kaisha: *See—*
Ueda, Mikio; Kubota, Takeshi; Nishikawa, Yasuo; and Watanabe, Akira, 4,025,460.

L. M. Ericsson Pty. Ltd.: *See—*
Wahren, Carl Johan Alexander; and Merdy, Leon Alexandra, 4,024,630.

L. Schuler GmbH: *See—*
Bergmann, Ewald; and Pfisterer, Horst, 4,024,747.

La Telemecanique Electrique: *See—*
Gautheron, Jean-Francois, 4,025,862.

Labaz: *See—*
Taillandier, Georges Marcel; Benoit-Guyod, Jean-Louis Alain; Boucherle, Andre Louis; Eymard, Pierre Luc; Broll, Madeleine; and Ferrandes, Bernard, 4,025,649.

Labbe, Francis A. M., to Molins Limited. Cigarette making machines. 4,024,878, Cl. 131-84.00B.

Lacharlotte, Pierre: *See—*
Rousselie, Claude Joseph; and Lacharlotte, Pierre, 4,024,955.

Lackore, James K.; and Ramler, Warren J., to PPG Industries, Inc. Ultraviolet light processor having rotating shutters. 4,025,795, Cl. 250-504.000.

LaConti, Anthony B., to General Electric Company. Electrically biased two electrode, electrochemical gas sensor with a $H_2$ counter/reference electrode incorporating a hydrogen storage buffering system. 4,025,412, Cl. 204-195.00R.

Lacroix, Bernard: *See—*
Pompei, Jean; Lacroix, Bernard; and Pierrot, Francis, 4,025,892.

Ladr, Ivan: *See—*
Suesser, Vaclav; Vach, Josef; Ladr, Ivan; and Auerbeck, Jiri, 4,025,713.

Lafayette Brass Company Inc.: *See—*
Blasnik, William, 4,025,000.

Lafever, Edward E.; and Gray, Larry O., to Dana Corporation. Motion detecting signal source. 4,025,819, Cl. 361-236.000.

Lafferty, William Daniel: *See—*
Cheney, Richard Frank; Lafferty, William Daniel; and Long, George Jacob, 4,025,334.

Lago, Rudolph M., to Mobil Oil Corporation. Manufacture of hydrocarbons. 4,025,571, Cl. 260-668.00D.

Lago, Rudolph M., to Mobil Oil Corporation. Manufacture of hydrocarbons. 4,025,572, Cl. 260-668.00D.

Laitar, Robert Anton: *See—*
Kretchmer, Richard Allan; and Laitar, Robert Anton, 4,025,537.

Lamb, Matthew J., to United States of America, Navy. Headgear suspension system. 4,024,586, Cl. 2-414.000.

Lamberti, Vincent; and Konort, Mark D., to Lever Brothers Company. Detergent composition. 4,025,450, Cl. 252-89.00R.

Lamotte, Michel; Dewey, Harry J.; Keller, Richard A.; and Ritter, Joseph J., to United States of America, Commerce. Photochemical method for chlorine isotopic enrichment. 4,025,406, Cl. 204-157.10R.

Lan-See, Inc.: *See—*
Schlagenhauf, Philip B., 4,024,592.

Landen, Paulette S., executrix: *See—*
Landen, William James, deceased; and Landen, Paulette S., executrix, 4,024,995.

Landen, William James, deceased; and Landen, Paulette S., executrix. Safety dispenser for an aerosol dispenser. 4,024,995, Cl. 222-402.110.

Landquist, Justus Kenneth: *See—*
Eakin, Murdoch Allan; and Landquist, Justus Kenneth, 4,025,647.

Lanfermann, Willy; and Renzing, Otto, to Gebr. Eickhoff, Maschinenfabrik und Eisengiesserei m.b.H. Spill-plate apparatus for a mining machine. 4,025,118, Cl. 299-43.000.

Lang, Gerard, to Societe Anonyme dite: L'Oreal. Azo dyes derived from 3-amino pyridine in hair dye compositions. 4,025,301, Cl. 8-10.100.

Lang, Walter W., to Westinghouse Electric Corporation. Circuit breaker with improved trip means having a high rating shunt trip. 4,025,821, Cl. 361-111.000.

Lang, Walter W.; and Wilson, John T., to Westinghouse Electric Corporation. Circuit breaker including undervoltage release mechanism and control circuit. 4,025,823, Cl. 361-111.000.

Lang, William H.: *See—*
Chang, Clarence D.; and Lang, William H., 4,025,575.
Chang, Clarence D.; and Lang, William H., 4,025,576.

Lange, Horst: *See—*
Theysohn, Friedrich; Gienapp, Horst; and Lange, Horst, 4,025,022.

Lange, Karl Heinz, to Balde-Werke Photographische Gerate & Kunststoff GmbH & Co. Axially displaceable lens housing. 4,025,936, Cl. 354-286.000.

Lange, Michael: *See—*
Corte, Herbert; Heller, Harold; Lange, Michael; and Netz, Otto, 4,025,705.

Lantrip, David B., to United States of America, Navy. Variable feel side stick controller. 4,024,651, Cl. 35-12.00S.

Lapp, Ken O., to Westech Industrial Ltd. Method and apparatus for flaring combustible waste gases. 4,025,281, Cl. 431-5.000.

Lappas, Lewis C.; and Hirsch, Clarence A., to Eli Lilly and Company. 5-Bromo-5-nitro-2-alkylsubstituted-1,3-dioxane. 4,025,533, Cl. 260-340.700.

Larko, Robert C.: *See—*
Smith, Jonathan; Larko, Robert C.; and Booth, Eugene E., 4,025,297.

La Roche, Ulrich, to BBC Brown Boveri & Company, Limited. Electro-optical liquid-crystal display device. 4,025,161, Cl. 350-160.0LC.

Larrison, Edward R.; and Reade, Ray O., to United States of America, Army. Energy absorbing device and detent for constant recoil slide. 4,024,793, Cl. 89-135.000.

Larsen, Olaf E., to Phillips Petroleum Company. Dry blending system for polyethylene fluff and additives. 4,025,480, Cl. 260-28.50A.

Larson, Charles O., to Charles O. Larson Co. Storage hook. 4,025,014, Cl. 248-203.000.
Larson, Harold W. Foot operated musical instrument. 4,024,787, Cl. 84-1.160.
Latham, Otis D., to Raymond Lee Organization, Inc., The, a part interest. Anklet tack belt. 4,024,999, Cl. 224-5.00R.
Latimer, John P.; Hagerty, Royal M.; and Zahn, George A., to Deepsea Ventures, Inc. Simulated testing of undersea apparatus. 4,024,758, Cl. 73-170.00A.
Lavrinenko, Irina Alexandrovna: *See—*
Naidich, Jury Vladimirovich; Lavrinenko, Irina Alexandrovna; Kondratsky, Vladimir Afanasievich; Semenov, Jury Nikolaevich; Emelyanov, Boris Mikhailovich; and Kogosov, Leonid Pinkhusovich, 4,024,675.
Lawrence Peska Associates, Inc.: *See—*
Fotis, James W., 4,024,669.
Hausladen, Joe, 4,025,095.
Massey, Earl, 4,025,004.
Lawton, Charles A., to Robbins & Myers, Inc. Torque demand thermal switch. 4,025,833, Cl. 318-221.00H.
LCA Corporation: *See—*
Kaeser, Robert E., 4,025,782.
Leach, Marcel Francis; and Rubin, Gottfried Adolf. Determination of particle sizes. 4,024,768, Cl. 73-432.0PS.
Leach, Wilfred F.: *See—*
Brookner, Eli; and Leach, Wilfred F., 4,025,921.
Leasure, William; Garcia, Luis; Reifel, Charles; and Shelton, Jack, to Mira-Pak, Inc. Carton forming apparatus. 4,024,693, Cl. 53-186.000.
Leasure, William C., to Mira-Pak, Inc. Method for continuous welding together of plastic sheets. 4,025,375, Cl. 156-79.000.
Leber, Jean-Pierre, to Sandoz Ltd. N-[O-(β-Cyanoethyl)-phosphonomethyl]-glycines and derivatives. 4,025,331, Cl. 71-86.000.
Leczycki, Moshe, to Plasson Maagan Michael Industries Limited. Pipe couplings and split rings used therein. 4,025,093, Cl. 285-343.000.
Lednicer, Daniel, to Upjohn Company, The. Organic compounds. 4,025,558, Cl. 260-570.5CA.
Lee, George Herbert: *See—*
Pook, Ian Michael; and Lee, George Herbert, 4,024,833.
Lee, Ho Chong: *See—*
Jensen, Donald Frederick; Lee, Ho Chong; and Tamulis, John Carl, 4,025,925.
Lee, James Kelly, to Eastman Kodak Company. Mirror-type beam steerer having a virtual pivot. 4,025,203, Cl. 350-285.000.
Lee, Wenpo, to Volkswagenwerk Aktiengesellschaft. Arrangement for preventing water from entering a fuel system of an internal combustion engine. 4,024,848, Cl. 123-136.000.
LeFevre, Clyde Eugene: *See—*
Owens, Ben Howard; LeFevre, Clyde Eugene; and Hagan, James Patrick, 4,025,177.
Legacy, Donald J.: *See—*
Browning, William W.; and Legacy, Donald J., 4,025,229.
Leggett & Platt Incorporated: *See—*
Goff, McKinley; and Hampton, Edward L., 4,025,020.
Lehureau, Jean-Claude; and Bricot, Claude, to Thomson-Brandt. Device for detecting focussing error in an optical reader head. 4,025,784, Cl. 250-201.000.
Leibundgut, Max; and Reber, Tony, to A L O S AG. Machine for reading image carriers. 4,025,175, Cl. 353-23.000.
Leichenko, Ilya Yakovlevich: *See—*
Mozhaev, Vasily Pavlovich; Leichenko, Ilya Yakovlevich; Gerasimov, Oleg Yakovlevich; Lyandres, Semen Grigorievich; Zuev, Jury Borisovich; Evdokimov, Boris Alexandrovich; and Matveev, July Alexandrovich, 4,025,355.
Leighty, Conard E.; and Vaughn, Kennith E., to Caterpillar Tractor Co. Seat support prop. 4,025,108, Cl. 297-335.000.
Leiser, Roger S.; Liaw, Gin Chain; and Schollmeier, Charles E., to A. E. Staley Manufacturing Company. Ion exchange enrichment of impure dextrose solutions. 4,025,357, Cl. 127-46.00A.
Leitz, Wilfried, to Koninklijke Emballage Industrie Van Leer B.V. Screw cap for a container. 4,024,952, Cl. 206-221.000.
Lemonie, Jean Marie; and Mathis, Jean Luc, to International Business Machines Corporation. Fabrication techniques for multilayer ceramic modules. 4,024,629, Cl. 29-625.000.
Lennington, John W.; and Sternberg, Stanley R., to Kilo Corporation. Object identification system. 4,025,791, Cl. 250-341.000.
Leo Pharmaceutical Products Ltd., A/S: *See—*
Beyer, Detlef; Linnet, Anton Pedersen; and Thomsen, Gerhard, 4,025,620.
Leon, Richard B.: *See—*
Anderson, Richard J.; and Leon, Richard B., 4,025,426.
Leonard, Louis H., Jr., to Carrier Corporation. Heat reclaiming system. 4,025,326, Cl. 62-175.000.
Leopold, Howard S.: *See—*
Scott, Calvin L.; and Leopold, Howard S., 4,024,818.
Lepoutre, Pierre, to Pulp and Paper Research Institute of Canada. Process for drying polymer-modified cellulose fibres and products produced thereby. 4,025,472, Cl. 260-17.4GC.
Lera Holding S.A.: *See—*
Blyweert, Pierre J., 4,024,680.
L'Esperance, Paul M.; and Pavlak, Alex. Solar energy reflector-collector. 4,024,852, Cl. 126-270.000.
Leupp, Alex M.; Lipton, Lewis T.; and Dill, Hans G., to Hughes Aircraft Company. Method of making integrated transistor matrix for flat panel liquid crystal display. 4,024,626, Cl. 29-571.000.
Leute, Richard K., to Syva Company. Polypeptide propoxyphene derivatives for immunoassay reagents. 4,025,501, Cl. 260-121.000.
Leutner, Bernd; and Diehl, Lothar, to BASF Aktiengesellschaft. Manufacture of sulfur concrete. 4,025,352, Cl. 106-70.000.
Leutwyler, Roy: *See—*
Jureit, John Calvin; Castillo, Adolfo; Leutwyler, Roy; Kushner, Benjamin H.; and Brodsky, Larry, 4,025,028.
Lever Brothers Company: *See—*
Lamberti, Vincent; and Konort, Mark D., 4,025,450.
Levy, Boris, to Polaroid Corporation. Image receiving elements comprising stannic oxide polymers having noble metals reduced thereon. 4,025,343, Cl. 96-3.000.
Lewis, Walter K.: *See—*
Craig, Walter J.; Lewis, Walter K.; and Bailey, Rondell L., 4,024,979.
Lhommelet, Robert; and Raynal, Jean-Paul, to Societe Generale de Constructions Electriques et Mecaniques(ALSTHOM). System with photocouplers for automatic checking of operating thyristors. 4,025,845, Cl. 324-51.000.
Li, Hsin Lang; Liland, Alfred Louis; and Oswald, Hendrikus Johan, to Allied Chemical Corporation. Method and apparatus for texturizing continuous filaments. 4,024,610, Cl. 28-1.300.
Li, Hsin Lang; Liland, Alfred Louis; and Oswald, Hendrikus Johan, to Allied Chemical Corporation. Method and apparatus for texturizing continuous filaments. 4,024,611, Cl. 28-1.300.
Liaw, Gin Chain: *See—*
Leiser, Roger S.; Liaw, Gin Chain; and Schollmeier, Charles E., 4,025,357.
Liberty Combustion Corporation: *See—*
Horn, Lawrence A.; and Carncross, Clayton J., 4,025,284.
Lieber, Jean, to Ateliers des Charmilles S.A. Hydraulic plant. 4,025,228, Cl. 415-205.000.
Liegel, Reinald D.: *See—*
Siderits, Robert T.; and Liegel, Reinald D., 4,024,973.
Lies, Thomas Andrew, to American Cyanamid Company. 2-(o-Tolyl-)imino-1,3-dithioles, a method for preparing the same, and their utilization as ixodicides. 4,025,532, Cl. 260-327.00M.
Liesenborghs, Roland. Sealed joint. 4,024,770, Cl. 74-18.200.
Lieser, Karl, to Werner, Hermann. Knife head, particularly for polygonal turning machines. 4,024,615, Cl. 29-105.00R.
Lift-All Company, Inc.: *See—*
Bridgehouse, Scott, 4,025,100.
Liland, Alfred Louis: *See—*
Li, Hsin Lang; Liland, Alfred Louis; and Oswald, Hendrikus Johan, 4,024,610.
Li, Hsin Lang; Liland, Alfred Louis; and Oswald, Hendrikus Johan, 4,024,611.
Lilly Industries, Ltd.: *See—*
Dunwell, David William; Evans, Delme; and Hicks, Terence Alan, 4,025,636.
Dunwell, David William; Evans, Delme; and Hicks, Terence Alan, 4,025,637.
Lilly, James L.: *See—*
Richards, William D. C.; Lilly, James L.; and Gray, Lawrence E., 4,025,248.
Linde Aktiengesellschaft: *See—*
Forster, Franz, 4,024,799.
Linde, Joachim; and Spath, Wolfgang, to Klockner-Werke AG. Injection molding machine. 4,025,266, Cl. 425-242.00R.
Linden, Erkki Olavi, to Oy Fiskars AB. Fastening arrangement for plastics handles of scissors and equivalent. 4,024,634, Cl. 30-341.000.
Lindner, Irmgard: *See—*
Obendorf, Werner; Lindner, Irmgard; Schwarzinger, Ernst; and Krieger, Josef, 4,025,550.
Linecker, Josef. Building ventilation system. 4,024,803, Cl. 98-33.00R.
Linkow, Leonard I.; and Edelman, Alfred E. Wide vent dental implants. 4,024,638, Cl. 32-10.00A.
Linnet, Anton Pedersen: *See—*
Beyer, Detlef; Linnet, Anton Pedersen; and Thomsen, Gerhard, 4,025,620.
Linsley, Jerald N.: *See—*
Buss, Russell A.; and Linsley, Jerald N., 4,025,498.
Linthout, Theodoor Hillebrand, to Oce-van der Grinten N.V. Process and apparatus for controlling the concentration of diazotype developing liquid. 4,024,885, Cl. 137-91.000.
Lippman, Alfred E., to Monsanto Company. Preparation of dialkyl phosphorochloridothioates. 4,025,586, Cl. 260-986.000.
Lipps, Edwin A. Geometric game pieces. 4,025,076, Cl. 273-137.00R.
Lipschutz, Paul, to Neiman, S.A. Anti-theft safety device for an automobile vehicle. 4,025,740, Cl. 200-44.000.
Lipton, Lewis T.: *See—*
Leupp, Alex M.; Lipton, Lewis T.; and Dill, Hans G., 4,024,626.
Litteral, Carl James; and Mullins, David Lee, to Union Carbide Corporation. Polysiloxane-polyoxyalkylene block copolymers. 4,025,456, Cl. 252-351.000.
Litton Systems, Inc.: *See—*
Kniskern, Leroy James, 4,025,744.
Liu, Hsing-ching; and Liu, Lan-dih. Educational toy. 4,024,650, Cl. 35-9.00R.
Liu, Lan-dih: *See—*
Liu, Hsing-ching; and Liu, Lan-dih, 4,024,650.
Lockheed Aircraft Corporation: *See—*
Kastan, Howard, 4,025,230.
Loeb, Leopold, to General Electric Company. Reusable water softener system for clothes washer. 4,025,427, Cl. 210-33.000.

Logan, Arthur D.: *See—*
Haren, Doyle V.; and Logan, Arthur D., 4,025,685.
Logan, Francis D.; and Dybala, Leonard M., to Camco, Incorporated. Drilling machine. 4,025,218, Cl. 408-11.000.
Logue, Joseph Carl: *See—*
Brickman, Norman Frederick; and Logue, Joseph Carl, 4,025,909.
Lohman, Gordon Russell: *See—*
Woodburn, James; and Lohman, Gordon Russell, 4,025,337.
Long, George Jacob: *See—*
Cheney, Richard Frank; Lafferty, William Daniel; and Long, George Jacob, 4,025,334.
Loosen, Paul: *See—*
Schafer, Horst-Dieter; Witzel, Manfred; Loosen, Paul; and Haarkotter, Hermann, 4,025,213.
Lopata, Ira L. Graphic communication system. 4,025,176, Cl. 353-26.00A.
Lord, Henry A.: *See—*
Reifers, Richard F.; Bixler, Kenneth D.; and Lord, Henry A., 4,025,038.
Lorimor, Gary D.: *See—*
Bergquist, Dwight H.; and Lorimor, Gary D., 4,025,131.
Loshin, Albert M., to Teleglobe Pay-TV System, Inc. Coding system for pay television apparatus. 4,025,948, Cl. 358-122.000.
Louis, Pierre Alexandre Georges. Sectional joint and slab from cast material. 4,024,689, Cl. 52-396.000.
Lovelock, James Ephraim. Ionization detectors with iron-55 as a radioactive source. 4,025,794, Cl. 250-381.000.
Lovely, Stephen C.: *See—*
Pellerin, William F.; and Lovely, Stephen C., 4,025,827.
Lowery, Charles L.: *See—*
Lowery, James V.; Lowery, Charles L.; Lowery, Vernon L.; and Lowery, Jimmy R., 4,025,030.
Lowery, James V.; Lowery, Charles L.; Lowery, Vernon L.; and Lowery, Jimmy R. Apparatus for making carpet strips. 4,025,030, Cl. 227-112.000.
Lowery, Jimmy R.: *See—*
Lowery, James V.; Lowery, Charles L.; Lowery, Vernon L.; and Lowery, Jimmy R., 4,025,030.
Lowery, Vernon L.: *See—*
Lowery, James V.; Lowery, Charles L.; Lowery, Vernon L.; and Lowery, Jimmy R., 4,025,030.
Lowry, Harold D.; and Allen, Robert F., to Eastman Kodak Company. Web transport apparatus. 4,025,937, Cl. 354-318.000.
Lucas, Joseph G., to Avco Corporation. Removal of ceramic investment shell mold from metal casting. 4,025,361, Cl. 134-28.000.
Luedtke, Arthur; and Bentley, William Ferrel, to United States of America, Federal Communications Commission. Mobile direction comparator. 4,025,924, Cl. 343-121.000.
LuK Lamellen und Kupplungsbau GmbH: *See—*
Maucher, Paul, 4,024,938.
Lum, Henry: *See—*
Matsumoto, Yutaka; and Lum, Henry, 4,025,950.
Lummus, J. Frank, to Raymond Lee Organization, Inc., The, a part interest. Ice block sled. 4,025,082, Cl. 280-12.00H.
Lunke & Sohn GmbH: *See—*
Grossbach, Alfred; and Mertin, Ralf, 4,025,104.
Lutz, Albert William; and Diehl, Robert Eugene, to American Cyanamid Company. 2,6-Dinitroaniline herbicides. 4,025,538, Cl. 260-397.600.
Lutz, Eugen: *See—*
Bergler, Otto; and Lutz, Eugen, 4,024,898.
Lutz, Eugene F.: *See—*
Kravetz, Louis; and Lutz, Eugene F., 4,025,453.
Lyandres, Semen Grigorievich: *See—*
Mozhaev, Vasily Pavlovich; Leichenko, Ilya Yakovlevich; Gerasimov, Oleg Yakovlevich; Lyandres, Semen Grigorievich; Zuev, Jury Borisovich; Evdokimov, Boris Alexandrovich; and Matveev, July Alexandrovich, 4,025,355.
Lynch, David D., Jr.; and Tower, Lee W., to Hughes Aircraft Company. Pipe line high speed signal processor. 4,025,771, Cl. 235-156.000.
Lynch, Don Murl: *See—*
Crovetti, Aldo Joseph; Kenney, Donald Sykes; Lynch, Don Murl; and Stein, Robert George, 4,025,530.
M.A.T. Industries, Inc.: *See—*
Amoroso, Michael J., 4,025,320.
MacDonald, Wayne W.: *See—*
Malvick, Arnold O.; and MacDonald, Wayne W., 4,025,422.
Macfarlan Smith Limited: *See—*
Grew, Edward Leon; and Wilson, Nigel David Vaughan, 4,025,520.
MacGuire, Andrew E., to Ferry Cap & Set Screw Company, The. Valve device and system employing the same. 4,024,846, Cl. 123-119.00D.
Machanian, William V., to Wurlitzer Company, The. Electronic musical instrument using integrated circuit components. 4,024,786, Cl. 84-1.010.
Machida Endoscope Co., Ltd.: *See—*
Chikama, Toshio, 4,024,858.
Machnikowski, Frank J. Bookmarker. 4,024,832, Cl. 116-119.000.
Mackauf, Peter Garrett: *See—*
Duggins, Ray Brown; Mackauf, Peter Garrett; and Withington, David Little, 4,024,716.
MacLean-Fogg Lock Nut Company: *See—*
Hlinsky, Emil J.; and Siblik, Allen D., 4,024,820.
MacLeay, Ronald Edward; and Sheppard, Chester Stephen, to Pennwalt Corporation. Secondary-aliphatic α-substituted azoalkanes. 4,025,502, Cl. 260-192.000.
MacMillan, Kenneth T., to MacMillan Mold Co., Inc. Segmented matrix with guide means and retaining pins. 4,025,250, Cl. 425-17.000.
MacMillan Mold Co., Inc.: *See—*
MacMillan, Kenneth T., 4,025,250.
Madison-Kipp Corporation: *See—*
Thomson, Ronald E.; and Kast, Philip J., 4,024,930.
Maeda, Ryozo; and Hirose, Katsumi, to Shionogi & Co., Ltd. Thiazole derivatives of benzoic and phenylalkanoic acids. 4,025,528, Cl. 260-306.80R.
Maggiulli, Cataldo Aldino; Burness, Donald MacArthur; and Perkins, William Clarence, to Eastman Kodak Company. Novel ethers, their preparation and use as oxydimethylating agents. 4,025,542, Cl. 260-456.00R.
Magna Ply: *See—*
Townsend, John M., 4,024,696.
Magnesium Elektron Limited: *See—*
Tawil, David S.; Clubley, Michael H.; and Farnworth, Frank, 4,025,608.
Maki, Masao: *See—*
Shibata, Tsuneo; Maki, Masao; Suzuki, Masao; and Kawabe, Hidehiko, 4,025,603.
Maki, Michiyoshi: *See—*
Kanda, Yozo; Maki, Michiyoshi; Migitaka, Masatoshi; and Sato, Kikuji, 4,025,941.
Makihara, Masuichi, to Shinnitoku Denki Kabushiki Kaisha. Silver mica block condenser and method of making the same. 4,025,829, Cl. 361-305.000.
Malec, Robert E.: *See—*
Plonsker, Larry; and Malec, Robert E., 4,025,451.
Malkin, David P.: *See—*
Weiss, Fredric M.; Malkin, David P.; Pugh, James; and Weiss, Charles, 4,024,639.
Malvick, Arnold O.; and MacDonald, Wayne W., to Tri/Valley Growers. Method and apparatus for inspecting food products. 4,025,422, Cl. 209-111.500.
Mancini, Giuseppe; Imparato, Luigi; and Schillani, Dario, to Snam Progetti S.p.A. Esters as components of lubricants. 4,025,447, Cl. 252-56.00S.
Manganello, Joseph Charles: *See—*
Judd, James Hewitt; and Manganello, Joseph Charles, 4,025,888.
Manierre Corporation: *See—*
Marth, Gerald A.; Hunnicutt, Wayne E.; and Jones, Daniel Lee, 4,024,965.
Manki, Yoshinori; and Uno, Takayoshi, to Tomoe Technical Research Company. Butterfly valve. 4,025,050, Cl. 251-306.000.
Mannes, Phillip: *See—*
Smith, Paul D.; and Mannes, Phillip, 4,024,889.
Mannesmann Aktiengesellschaft: *See—*
Hendrischk, Wolfgang; Ott, Hubert; Seybold, Wolfgang; Heisele, Horst; and Mayr, Karl, 4,024,940.
Mannesmannrohren-Werke AG: *See—*
Muller, Manfred; and Schirmag, Klaus-Peter, 4,024,946.
Marceau, Joseph Arthur: *See—*
Donnelly, Dennis J.; Marceau, Joseph Arthur; McMillan, Joseph Corey; and Moji, Yukimori, 4,025,681.
Marchiselli, Sergio, to Zallas Establishment. Washing machine. 4,024,735, Cl. 68-16.000.
Marcus, Holger: *See—*
Scholdstrom, Karl Ragnar; Marcus, Holger; Nordstrom, Lennart; and Stahl, Nils, 4,025,192.
Marek, Miroslav; Toman, Ludek; and Pecka, Jan, to Ceskoslovenska akademie ved. Method of radiation polymerization and copolymerization of isobutylene by a cationic mechanism. 4,025,402, Cl. 204-159.240.
Marek, Miroslav; Toman, Ludek; and Pecka, Jan, to Ceskoslovenska akademie ved. Method of radiation polymerization and copolymerization of isobutylene by a cationic mechanism. 4,025,403, Cl. 204-159.240.
Maremont Corporation: *See—*
Gray, Alden J.; Sanderson, Ian S.; and Hardy, John C., 4,025,960.
Markfelder, Gunter; and Teich, Wolfgang, to Kugelfischer Georg Schafer & Co. Friction bearing with sliding members. 4,025,129, Cl. 308-3.00R.
Markwort, Helmut: *See—*
Reichhardt, Horst Ludwig; Muller, Eckart; and Markwort, Helmut, 4,025,424.
Marling, John B., to United States of America, Energy Research and Development Administration. Deuterium separation by infrared-induced addition reaction. 4,025,408, Cl. 204-163.00R.
Marston, Peter G.: *See—*
Nolan, John J.; and Marston, Peter G., 4,025,432.
Martel Mendez, Jose Jeronimo. Device for self-orientation of the axis of vehicles, trailers and semi-trailers. 4,025,084, Cl. 280-141.000.
Martel, Richard A.; and Salisbury, Charles W., to Owens-Illinois, Inc. Method of permanently attaching metallic spacers in gaseous discharge display panels. 4,024,613, Cl. 29-25.130.
Marth, Gerald A.; Hunnicutt, Wayne E.; and Jones, Daniel Lee, to Manierre Corporation. Bag palletizing apparatus. 4,024,965, Cl. 214-6.00P.
Martin, Joachim; Haas, Ernst; Reuschel, Konrad; and Schnoller, Manfred, to Siemens Aktiengesellschaft. Method of producing homogeneously doped p-conductive semiconductor materials. 4,025,365, Cl. 148-1.500.

Martin, Waylan C. Calcium and magnesium hydroxide plugging process. 4,024,917, Cl. 166-292.000.

Martin, William E., to United States of America, Navy. Gradient index miniature coupling lens. 4,025,157, Cl. 350-96.00C.

Martinez, Eugene, to Reibel, Robert H., a part interst. Dual purpose projection screen. 4,025,160, Cl. 350-117.000.

Martucci, Frank C., to Raymond Lee Organization, Inc., The, a part interest. Redundant electrical grounding system. 4,025,139, Cl. 339-14.00R.

Maruzen Oil Co. Ltd.: *See—*
Fujiwara, Hiroshi; Jawara, Kinya; Miyoshi, Kaoru; and Mukai, Makoto, 4,025,401.

Marzonie, James M.; and Jautakis, Karl, to Whirlpool Corporation. Electrically heated dryer. 4,025,754, Cl. 219-400.000.

Masaki, Hideyuki, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Sintered silicon nitride base ceramic and said ceramic. 4,025,351, Cl. 106-59.000.

Masclet, Jean, to Messier Hispano. Actuating and bracing jack. 4,024,800, Cl. 92-26.000.

Masclet, Jean, to Messier Hispano. Apparatus for eliminating the effects of cavitation in a main pump. 4,025,238, Cl. 417-203.000.

Massachusetts Institute of Technology: *See—*
Walker, Laurence G., 4,025,910.

Massey, Earl, to Lawrence Peska Associates, Inc. Toilet tissue roll holder. 4,025,004, Cl. 242-55.300.

Mastis, Victor: *See—*
Klimek, Boleslaw M.; and Mastis, Victor, 4,024,604.

Masuda, Hiroaki: *See—*
Iinoya, Koichi; Masuda, Hiroaki; and Watanabe, Kinnosuke, 4,024,985.

Material Ksz.: *See—*
Bar, Vilmos; Mercz, Jeno; Szvoboda, Janos; Pollak, Zsuszanna B.; and Matyas, Jakab, 4,025,631.

Mathis, Jean Luc: *See—*
Lemonie, Jean Marie; and Mathis, Jean Luc, 4,024,629.

Mathis, Ronald D.: *See—*
Dix, James S.; and Mathis, Ronald D., 4,025,488.

Matsumoto, Masakazu; Nishide, Katsuhiko; Shimosawa, Akemi; and Kinjo, Kikuo, deceased (by Kinjo, Ayako, legal successor), to Canon Kabushiki Kaisha. Image recording member. 4,025,399, Cl. 204-2.000.

Matsumoto, Yutaka; and Lum, Henry, to United States of America, National Aeronautics and Space Administration. Sampling video compression system. 4,025,950, Cl. 358-133.000.

Matsunaga, Kinjiro, to Kao Soap Co., Ltd. Process for preparing stable sodium percarbonate. 4,025,609, Cl. 423-415.00P.

Matsuno, Kazuo: *See—*
Nakao, Hisaji; Naruse, Katutoshi; Hasegawa, Kazuhiko; Kawade, Sadao; Tokura, Yasufumi; and Matsuno, Kazuo, 4,025,902.

Matsushita Electric Industrial Co., Ltd.: *See—*
Hamaguchi, Youshi; Yukami, Noboru; Tomioka, Tatsuyuki; Shimizu, Yoshihito; and Kondo, Hiroyuki, 4,025,890.
Kimura, Takeji; Inoue, Michihiro; Sato, Masaharu; and Horiuchi, Shiro, 4,025,940.
Shibata, Tsuneo; Maki, Masao; Suzuki, Masao; and Kawabe, Hidehiko, 4,025,603.
Tanaka, Toshiharu; Tsuda, Naoteru; and Arase, Kazuhide, 4,025,879.

Matsuyama, Mitsuo; and Okuhara, Shinzi, to Hitachi, Ltd. Cathode gate triggering method and system for speech path switches. 4,025,726, Cl. 179-18.0GF.

Matsuzaki, Atsushi: *See—*
Fujie, Masakatsu; Yamamoto, Hiroshi; and Matsuzaki, Atsushi, 4,025,060.

Matsuzawa, Kenji: *See—*
Morimoto, Toru; and Matsuzawa, Kenji, 4,025,335.

Matthews, Hugh B., to Sperry Rand Corporation. Geothermal energy control system and method. 4,025,240, Cl. 417-365.000.

Matveev, July Alexandrovich: *See—*
Mozhaev, Vasily Pavlovich; Leichenko, Ilya Yakovlevich; Gerasimov, Oleg Yakovlevich; Lyandres, Semen Grigorievich; Zuev, Jury Borisovich; Evdokimov, Boris Alexandrovich; and Matveev, July Alexandrovich, 4,025,355.

Matyas, Jakab: *See—*
Bar, Vilmos; Mercz, Jeno; Szvoboda, Janos; Pollak, Zsuszanna B.; and Matyas, Jakab, 4,025,631.

Matys, Edwin J., to Tula Machine Co., Inc. Locking device for the prongs of an electrical plug. 4,025,140, Cl. 339-37.000.

Maucher, Paul, to LuK Lamellen und Kupplungsbau GmbH. Clutch disk with plural dampers. 4,024,938, Cl. 192-106.200.

Mauer, James E.; and DiGerlando, Benedict, to Zartic Frozen Meats, Inc. Machine for forming discrete quantities of material into a predetermined shape. 4,025,273, Cl. 425-332.000.

Maury, Christian, to Compagnie Internationale pour l'Informatique. Device for an accurate control of final positioning and follow-up of a displaceable member with respect to a reference. 4,025,839, Cl. 318-632.000.

Maximuk, Boris Yakovelevich: *See—*
Trakhtenberg, Jury Borisovich; Oleshko, Vasily Grigorievich; Klimentiev, Vladimir Ivanovich; Zapunny, Alexandr Iosifovich; Robakovsky, Yaroslav Nikolaevich; Rossikhin, Vladimir Petrovich; and Maximuk, Boris Yakovelevich, 4,024,744.

May, Hans-Joachim: *See—*
Baganz, Horst; and May, Hans-Joachim, 4,025,639.

Mayfield, Windel O.; Thomerson, Clarence T.; and Waldrop, Tom C., to Regal Tool & Rubber Co. Inc. Platform leg diaphragm. 4,024,723, Cl. 61-98.000.

Mayr, Karl: *See—*
Hendrischk, Wolfgang; Ott, Hubert; Seybold, Wolfgang; Heisele, Horst; and Mayr, Karl, 4,024,940.

Mazelli, Jack R., to San Diego Gas & Electric Co.; and Dual Fuel Systems, Inc. Method of odorizing liquid natural gas. 4,025,315, Cl. 44-52.000.

Mazur, Robert H.: *See—*
Goldkamp, Arthur H.; Mazur, Robert H.; and Schlatter, James M., 4,025,551.

McBane, Bruce N.: *See—*
Porter, Samuel, Jr.; and McBane, Bruce N., 4,025,474.

McCarty, William J., to General Electric Company. Heat pump frost control system. 4,024,722, Cl. 62-81.000.

McClain, James E.; and Scott, Howard L., to Esco Manufacturing Company. Negative sequence compensation for polyphase equipment. 4,025,834, Cl. 318-228.000.

McCloskey, Albert R., to Heim Universal Corporation. Self-aligning bearing with a split inner member. 4,024,616, Cl. 29-149.50B.

McCormick, Harold E., to Ramsey Corporation. Method of applying a refractory coating to metal substrate. 4,024,617, Cl. 29-156.630.

McDiarmid, John C.; and Chapman, Darrell F. Artificial fishing lure or bait having retractable hook means. 4,024,668, Cl. 43-35.000.

McDill, Richard T.: *See—*
Mead, Theodore C.; McDill, Richard T.; Chesluk, Ralph P.; and Odell, Norman R., 4,025,583.

McDonald, Andrew: *See—*
Munday, John Charles; and McDonald, Andrew, 4,025,865.

McDonald, William N.: *See—*
Jackman, Robert M.; and McDonald, William N., 4,024,893.

McDowell-Wellman Engineering Company, The: *See—*
Cheek, Edward E.; and Tuli, Kuljit S., 4,024,962.

McFadden, Arthur Raymond; and Aultz, Daniel Eugene, to American Hoechst Corporation. Oxothienobenzoxepin-acetic acids, precursors and derivatives thereof. 4,025,640, Cl. 424-275.000.

McGill, Lee E.; and Von Alven, Raymond D., to Cutter Laboratories, Inc. Respiratory exerciser. 4,025,070, Cl. 272-99.000.

McGinness, Joseph P.: *See—*
Ekholm, LaVerne G.; Kuchta, Bernard R.; and McGinness, Joseph P., 4,025,395.

McGinniss, Vincent Daniel, to SCM Corporation. Dual cure cathodic electrocoating process. 4,025,409, Cl. 204-181.000.

McGrath, Joseph M., to Minnesota Mining and Manufacturing Company. Cellular retroreflective sheeting. 4,025,159, Cl. 350-105.000.

McGregor, Ronald W., to Vought Corporation. Automatic valving system. 4,024,887, Cl. 137-386.000.

McInturff, Carol Edward. Lockable mounting means for removeably supporting electronic accessories in vehicles. 4,024,737, Cl. 70-58.000.

McKay, Dwight L., to Phillips Petroleum Company. Passivating metals on cracking catalysts. 4,025,458, Cl. 252-416.000.

McKay, Richard H.; Smith, William R.; and Deutsch, Herman, to Video Voter Inc. Voting system. 4,025,757, Cl. 235-54.00F.

McKeever, Dennis: *See—*
Evani, Syamalarao; McKeever, Dennis; and Raymond, Russell J., 4,025,484.

McLorg, Terence W.: *See—*
Rain, Lloyd H.; and McLorg, Terence W., 4,024,679.

McMillan, Joseph Corey: *See—*
Donnelly, Dennis J.; Marceau, Joseph Arthur; McMillan, Joseph Corey; and Moji, Yukimori, 4,025,681.

McNeil Laboratories, Incorporated: *See—*
Rasmussen, Chris Royce, 4,025,517.

McVey, Charles I., to General Electric Company. Alumina ceramic alkali metal lamp having metal getter structure. 4,025,812, Cl. 313-176.000.

Mead Corporation, The: *See—*
Shackle, Dale Richard, 4,025,455.
Weaver, Frederick D., 4,025,490.

Mead, Theodore C.; McDill, Richard T.; Chesluk, Ralph P.; and Odell, Norman R., to Texaco Inc. Amine adducts of ethyl oleyl acid orthophosphate. 4,025,583, Cl. 260-925.000.

Meader, Arthur L., Jr.; and Runyon, William L., Jr., to Chevron Research Company. Urethane-based water-proofing/sound-proofing coating composition. 4,025,683, Cl. 428-215.000.

Mecano Quimica S.A.: *See—*
Sibidi, Juan Ramoneda, 4,025,234.

Meckler, Milton. Solar powered heat reclamation air conditioning system. 4,024,908, Cl. 165-18.000.

Medtronic, Inc.: *See—*
Putzke, James J., 4,024,875.

Mee, John David, to Eastman Kodak Company. Silver halide photographic elements spectrally sensitized with an acetylenic analog of cyanine or merocyanine dyes. 4,025,349, Cl. 96-120.000.

Meguro, Daitetsu: *See—*
Shiozaki, Tadao; and Meguro, Daitetsu, 4,025,384.

Meier, Johann Hans; and Raider, Jerry Wesley, to International Business Machines Corporation. Adaptive control circuit for a stepping motor. 4,025,837, Cl. 318-561.000.

Meister, Rene; and Tyrode, Alain, to Ebauches S.A. Method of manufacturing an electric timepiece and electric timepiece obtained by carrying out this method. 4,024,677, Cl. 58-23.00R.

Melnyk, Paul, to TRW Inc. Process for fabrication of high impact strength composites. 4,025,036, Cl. 228-193.000.

Mendiratta, Sudhir K.; Dotson, Ronald L.; and Shipley, George M., to

Olin Corporation. Hydrogen halide removal in halogenated aliphatic nitrile production. 4,025,545, Cl. 260-465.700.
Menon, Sukumaran K.; and Guran, Zenon, to Xerox Corporation. Screen cleaning device. 4,025,181, Cl. 355-3.00R.
Mera, Yoshiaki: *See—*
Suzuki, Fumio; Tanaka, Mitsuo; and Mera, Yoshiaki, 4,025,526.
Merck & Co., Inc.: *See—*
Rooney, Clarence S.; Rokach, Joshua; and Cragoe, Edward J., Jr., 4,025,625.
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Bar, Vilmos; Mercz, Jeno; Szvoboda, Janos; Pollak, Zsuszanna B.; and Matyas, Jakab, 4,025,631.
Merdy, Leon Alexandra: *See—*
Wahren, Carl Johan Alexander; and Merdy, Leon Alexandra, 4,024,630.
Merianos, John J.: *See—*
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., 4,025,617.
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., 4,025,627.
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., 4,025,653.
Merritt, Robert E.; and Tibbals, E. C. Apparatus and method for supplying constant tension material. 4,025,026, Cl. 226-7.000.
Mertin, Ralf: *See—*
Grossbach, Alfred; and Mertin, Ralf, 4,025,104.
Mesek, Frederick K., to Johnson & Johnson. Disposable diaper with permanently attached adhesive belt fastening means. 4,024,867, Cl. 128-287.000.
Messerschmitt-Bolkow-Blohm GmbH: *See—*
Jonda, Wolfgang, 4,025,675.
Peikert, Juergen, 4,025,008.
Messier Hispano: *See—*
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Metallgesellschaft Aktiengesellschaft: *See—*
Reichhardt, Horst Ludwig; Muller, Eckart; and Markwort, Helmut, 4,025,424.
Stonner, Hans Martin; and Wiesner, Paul, 4,025,423.
Michael, Peter Colin, to Micro Consultants Limited. Video assignment systems. 4,025,947, Cl. 358-86.000.
Michaels, John Mark: *See—*
Croopnick, Gerald Allan; and Michaels, John Mark, 4,025,425.
Michalczyk, Georg: *See—*
Sandhack, Lothar; Webers, Werner; Michalczyk, Georg; and Gluzek, Karl-Heinz, 4,025,534.
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Microdot, Inc.: *See—*
Prisco, Robert C.; and Myers, Paul D., 4,024,892.
Microtherm GmbH, Firma: *See—*
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Kanda, Yozo; Maki, Michiyoshi; Migitaka, Masatoshi; and Sato, Kikuji, 4,025,941.
Miki, Masayuki; and Miyakawa, Nobukai, to Hitachi, Ltd. Frequency digital converter. 4,025,868, Cl. 328-141.000.
Miki, Tosaku; Hosokawa, Yasuhiro; Miwa, Tamotsu; Fujita, Hiroshi; Asano, Masahide; and Aibara, Shunzo, to Daiichi Seiyaku Co., Ltd. Tyrosine derivatives and use. 4,025,644, Cl. 424-300.000.
Mikogami, Akio: *See—*
Yamashita, Mitsuo; Mikogami, Akio; Hasegawa, Masashi; and Oizumi, Hiroshi, 4,025,464.
Miksovsky, Felix; and Fikentscher, Rolf, to BASF Aktiengesellschaft. Manufacture of aziridinecarboxylic acid esters. 4,025,503, Cl. 260-239.00E.
Mikulla, Volker: *See—*
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Miles, David Roy; and Woolcock, Alun, to Imperial Chemical Industries Limited. Mixing apparatus. 4,025,056, Cl. 259-6.000.
Miles Laboratories, Inc.: *See—*
Clemens, Anton Hubert, 4,025,241.
Miller, David R.; and Wolfe, Jack D., deceased (by Wolfe, Edith B., executrix), to Prismo Universal Corporation. Traffic paint method and composition. 4,025,476, Cl. 260-22.0CQ.
Miller, Edward F.: *See—*
Hellmuth, Walter W.; and Miller, Edward F., 4,025,445.
Miller, Gladys D.: *See—*
Renk, Richard J.; and Boller, George E., 4,025,079.
Miller, Gustave: *See—*
Priska, Martin T.; and Ringquist, Russell V., 4,025,075.
Miller, James A., to Bell & Howell Company. Race tally apparatus. 4,025,900, Cl. 340-172.500.
Miller, John Daniel: *See—*
Randolph, Alan; Drach, George; and Miller, John Daniel, 4,025,307.
Miller, Julius, to Electronic Sheetmetal Craftsmen of Florida, Inc. Wall mounted lift for a television receiver or the like. 4,025,017, Cl. 248-297.000
Millmaster Onyx Corporation: *See—*
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., 4,025,617.
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., 4,025,627.
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., 4,025,653.
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Milne, Alexander, to International Paint Co., Ltd., The. Anti-fouling marine compositions. 4,025,693, Cl. 428-447.000.
Mimura, Koji: *See—*
Setsuie, Takashi; Fujinaga, Yoshikazu; and Mimura, Koji, 4,025,279.
Minami, Shunsuke: *See—*
Kamada, Kensuke; and Minami, Shunsuke, 4,025,439.
Minchak, Robert J.; and Beauregard, Robert E., to B. F. Goodrich Company, The. Process for polymerizing cyclopentene. 4,025,708, Cl. 526-142.000.
Miner, Earl L., to Detroit Tool & Engineering Co. Brush control system for vehicle wash apparatus. 4,024,598, Cl. 15-53.00A.
Minnesota Mining and Manufacturing Company: *See—*
Beretta, Paolo; and Valbusa, Luigi, 4,025,347.
McGrath, Joseph M., 4,025,159.
Pletcher, Wayne A.; and Vermillion, Russell L., 4,025,694.
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Kurita, Takaji; Utsumi, Tetsuya; Ikeda, Hiroshi; Komura, Masaru; Miyata, Shin; Kawai, Yoshihisa; and Arai, Kenichi, 4,025,180.
Mintz, Daniel. Ladder. 4,024,929, Cl. 182-151.000.
Mira-Pak, Inc.: *See—*
Leasure, William; Garcia, Luis; Reifel, Charles; and Shelton, Jack, 4,024,693.
Leasure, William C., 4,025,375.
Mirhej, Michael E., to Du Pont de Nemours, E. I., and Company. Process for preparing mixed filament yarns. 4,025,595, Cl. 264-103.000.
Mishcon, Lester; and Agulnek, Harry, to Singer Company, The. Multiple pattern wheel. 4,024,733, Cl. 66-50.00A.
Missios, Michael Herodotus; and Werner, John Richard, to Burroughs Corporation. Method and apparatus for testing and diagnosing data processing circuitry. 4,025,768, Cl. 235-153.0AC.
Mitchell, Thomas L., to Caterpillar Tractor Co. Overcenter latch. 4,025,094, Cl. 292-87.000.
Mitsubishi Denki Kabushiki Kaisha: *See—*
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Shibayama, Kyoichi; Ono, Hiroshi; Jidai, Eiki; and Saeki, Hideo, 4,025,037.
Shibayama, Kyoichi; Sato, Fumihiko; and Takahama, Takashi, 4,025,415.
Tabata, Norikazu; Yagi, Shigenori; and Ueno, Takanori, 4,025,441.
Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See—*
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Mitsubishi Rayon Co., Ltd.: *See—*
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Setsuie, Takashi; Fujinaga, Yoshikazu; and Mimura, Koji, 4,025,279.
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Mitsui Shipbuilding and Engineering Co., Ltd.: *See—*
Ueda, Mikio; Kubota, Takeshi; Nishikawa, Yasuo; and Watanabe, Akira, 4,025,460.
Miura, Katsuhiko, to Alps Electric Co., Ltd. Television tuner circuit. 4,025,857, Cl. 325-452.000.
Miwa, Tamotsu: *See—*
Miki, Tosaku; Hosokawa, Yasuhiro; Miwa, Tamotsu; Fujita, Hiroshi; Asano, Masahide; and Aibara, Shunzo, 4,025,644.
Miyagawa, Fumihiro, to Ricoh Co., Ltd. Data recording system for camera. 4,025,932, Cl. 354-109.000.
Miyakawa, Nobukai: *See—*
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Miyashita, Kyoichi: *See—*
Arima, Sumitaro; Oda, Minoru; Miyashita, Kyoichi; and Takada, Mamoru, 4,025,788.
Miyata, Shin: *See—*
Kurita, Takaji; Utsumi, Tetsuya; Ikeda, Hiroshi; Komura, Masaru; Miyata, Shin; Kawai, Yoshihisa; and Arai, Kenichi, 4,025,180.
Miyata, Shizuo; and Nakao, Motokazu, to Sharp Kabushiki Kaisha. Liquid developer reservoir for copying machine. 4,025,938, Cl. 354-324.000.
Miyatuka, Hajime; and Honjo, Satoru, to Fuji Photo Film Co., Ltd. Method for machining metal work. 4,025,338, Cl. 96-1.00R.
Miyazawa, Makoto: *See—*
Moriguchi, Sanseki; Abe, Hiroshi; Nishida, Taisuke; Takenaka, Jyoichi; Miyazawa, Makoto; and Iwabuchi, Sadayoshi, 4,025,604.
Miyoshi, Kaoru: *See—*
Fujiwara, Hiroshi; Jawara, Kinya; Miyoshi, Kaoru; and Mukai, Makoto, 4,025,401.
Mizoguchi, Yoshiyuki: *See—*
Tsuda, Nobuaki; Inagaki, Kenji; Imamiya, Tamotu; Ohno, Kunio; and Mizoguchi, Yoshiyuki, 4,025,436.
Mizuguchi, Hideki, to Dai Nippon Toryo Co., Ltd.; and DAI Nippon Toryo Co. Ltd. Continuous extruder for thermosetting resins. 4,025,058, Cl. 259-192.000.

Mizuno, Hitoshi; and Akiyama, Satoshi, to Kabushiki Kaisha Shikutani. Mowing apparatus. 4,024,635, Cl. 30-276.000.
Mizuochi, Hisayuki, to Seibu Polymer Kasei Kabushiki Kaisha. Reflex light reflecting sheet. 4,025,674, Cl. 428-29.000.
Mladota, John, to Bolton-Emerson, Inc. Screen changer with pre-fill screen blocks. 4,025,434, Cl. 210-236.000.
Mobay Chemical Corporation: *See—*
Bailey, John V.; Cleveland, Thomas H.; and Wirfel, Emanuel W., 4,025,489.
Mobil Oil Corporation: *See—*
Chang, Clarence D.; and Lang, William H., 4,025,575.
Chang, Clarence D.; and Lang, William H., 4,025,576.
Cier, Ronald J.; and Bridger, Robert F., 4,025,446.
Lago, Rudolph M., 4,025,571.
Lago, Rudolph M., 4,025,572.
Nnadi, John C.; and Heilweil, Israel Joel, 4,025,452.
Orlando, Matthew R., 4,024,752.
Pavlica, Robert T., 4,025,417.
Roberts, William Walter, Jr., 4,024,762.
Mochizuki, Manabu, to Ricoh Co., Ltd. Developing electrode contamination prevention system for electrophotography. 4,025,184, Cl. 355-10.000.
Modena, Mario; and Bisel, Roberto, to Montedison Fibre S.p.A. Halogenated phosphoric esters and flame-proofing compositions for polymeric materials based thereon. 4,025,468, Cl. 260-2.5AJ.
Moehlenpah, Walter G. Apparatus for fabricating wood structures. 4,024,809, Cl. 100-100.000.
Moffitt, John Stuart, to International Business Machines Corporation. Burster apparatus. 4,025,023, Cl. 225-100.000.
Moji, Yukimori: *See—*
Donnelly, Dennis J.; Marceau, Joseph Arthur; McMillan, Joseph Corey; and Moji, Yukimori, 4,025,681.
Molins Limited: *See—*
Labbe, Francis A. M., 4,024,878.
Molitorisz, Joseph. Cutting mechanism for rotary compacting machines for fibrous material. 4,024,808, Cl. 100-89.000.
Moller, Tilo, to Heckler & Koch GmbH. Automatic shoulder arm. 4,024,792, Cl. 89-129.00B.
Molson Companies Limited, The: *See—*
Hodgetts, Ernest J., 4,024,621.
Monier Colourtile Pty. Ltd.: *See—*
Aarons, Raymond Joseph, 4,024,685.
Monroe, Lawrence S., to Textron, Inc. Method and apparatus for folding and fusing the elements of a slide fastener string. 4,025,277, Cl. 425-383.000.
Monsanto Company: *See—*
Agrawal, Purushottam D., 4,025,594.
Franz, John E., 4,025,332.
Hu, Shengen, 4,025,482.
Lippman, Alfred E., 4,025,586.
Rutkowski, Robert; and Taylor, Andrew M., 4,025,261.
Montag, Alfred C.: *See—*
Johnstone, Richard T.; Montag, Alfred C.; Franklin, Charles H.; and Vinton, Clarence S., 4,025,062.
Montecatini Edison S.p.A.: *See—*
Natta, Giulio; Valvassori, Alberto; Sartori, Guido; and Cameli, Nazzareno, 4,025,497.
Montedison Fibre S.p.A.: *See—*
Modena, Mario; and Bisel, Roberto, 4,025,468.
Montino, Franco; Colombo, Luigi; and Sironi, Giuseppe, 4,025,611.
Montino, Franco; Colombo, Luigi; and Sironi, Giuseppe, to Montedison Fibre S.p.A. Process for obtaining hyperfine magnetite powder. 4,025,611, Cl. 423-632.000.
Montrose Properties Limited: *See—*
Pickard, John Frederick; and Pickard, Gillian Susan, 4,024,928.
Moody, Burton E.; and Schuster, John E., to Air Products and Chemicals, Inc. Gasification of hydrocarbon feedstocks. 4,025,318, Cl. 48-213.000.
Moon, Ronald L., to Varian Associates. Ohmic contracts to p-type indium phosphide. 4,025,944, Cl. 357-67.000.
Mooney, Thomas J.: *See—*
Taylor, Thomas N.; Schoppe, Wayne F.; and Mooney, Thomas J., 4,025,187.
Moore, Robert Clark: *See—*
United States of America, National Aeronautics and Space Administration; and Moore, Robert Clark, 4,025,866.
Moran, Kevin E. Rotor for wind-driven machine. 4,025,233, Cl. 416-207.000.
Moretz, George E.: *See—*
Racunas, Bernard J.; Kastelic, Raymond; Proctor, William L., Jr.; and Moretz, George E., 4,025,287.
Morgan, Paul Winthrop, to Du Pont de Nemours, E. I., and Company. Process for preparing film- and fiber-forming poly(1,4-benzamide). 4,025,494, Cl. 260-78.00A.
Morgardshammar Aktiebolag: *See—*
Karlberger, Walter Johann, 4,024,745.
Moriguchi, Sanseki; Abe, Hiroshi; Nishida, Taisuke; Takenaka, Jyoichi; Miyazawa, Makoto; and Iwabuchi, Sadayoshi, to Nippon Kokan Kabushiki Kaisha. Method of removing nitrogen oxides from exhaust gas by reduction. 4,025,604, Cl. 423-239.000.
Morimoto, Takeshi: *See—*
Oda, Yoshio; Uchida, Keiichi; Suhara, Manabu; and Morimoto, Takeshi, 4,025,565.
Morimoto, Toru; and Matsuzawa, Kenji, to Nippon Dia Clevite Co., Ltd. Method for the recovery of useful metallic components. 4,025,335, Cl. 75-135.000.
Morimoto, Toru: *See—*
Sagane, Norio; Morimoto, Toru; and Okagawa, Fumihiko, 4,025,257.
Morino, Ikuo; and Aisu, Nobuo, to Nippon Paint Co., Ltd. Thermoplastic duplication plate manufacturing apparatus. 4,025,263, Cl. 425-168.000.
Morris, Caleb G.: *See—*
Morris, Caleb Ganeo, 4,024,653.
Morris, Caleb Ganeo, to Morris, Caleb G. Bumper blade with tie-down attachment. 4,024,653, Cl. 37-42.00R.
Morrison, John A.: *See—*
Stackhouse, James H., Jr.; Craze, Edward G., Jr.; Morrison, John A.; and Scheurich, Joseph T., 4,025,324.
Morse, Robert S., to Burroughs Corporation. Dual in-line package with window frame. 4,025,716, Cl. 174-52.0FP.
Moscony, John Joseph; and Pinscinski, Joseph John, to RCA Corporation. Method of making viewing-screen structure for a cathode-ray tube. 4,025,661, Cl. 427-68.000.
Mosher, Paul R.: *See—*
Csanady, Elmer R.; Mosher, Paul R.; and Camp, Albert T., 4,025,370.
Mosior, Donald J.: *See—*
Cawood, Charles David; and Mosior, Donald J., 4,025,776.
Motorola, Inc.: *See—*
Hanna, John E., 4,025,870.
Rioux, Philip Joseph, 4,024,596.
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Thompson, David F.; and Mouton, William J., Jr., 4,025,220.
Mozhaev, Vasily Pavlovich; Leichenko, Ilya Yakovlevich; Gerasimov, Oleg Yakovlevich; Lyandres, Semen Grigorievich; Zuev, Jury Borisovich; Evdokimov, Boris Alexandrovich; and Matveev, July Alexandrovich. Process for the preparation of starting mixture for making construction elements. 4,025,355, Cl. 106-290.000.
Muehl, Herman D. Safety locking cover assembly for tank domes. 4,024,983, Cl. 220-316.000.
Mueller, Hugo, to American Flange & Manufacturing Co., Inc. Gasket inspection method. 4,025,421, Cl. 209-85.000.
Mueller, Johannes: *See—*
Bickel, Hans; and Mueller, Johannes, 4,025,509.
Mueller, Ortwin, to Carl Zeiss-Stiftung. Method of and apparatus for the automatic focusing of stereoscopic microscopes. 4,025,785, Cl. 250-204.000.
Mueller, Thomas L., to Engel Industries, Inc. Rotary slitting shear having separately powered cutters. 4,024,784, Cl. 83-488.000.
Mugishima, Hirobumi. Apparatus for transferring formed unbaked and baked dough and confectionary from a feed conveyor through a transfer conveyor onto a receiving conveyor. 4,024,945, Cl. 198-424.000.
Mukai, Makoto: *See—*
Fujiwara, Hiroshi; Jawara, Kinya; Miyoshi, Kaoru; and Mukai, Makoto, 4,025,401.
Mukaida, Yutaka: *See—*
Enomoto, Satoru; Takita, Hitoshi; Wada, Hisayuki; Mukaida, Yutaka; and Yanaka, Mikiro, 4,025,475.
Muldoon, James P. Colostomy device and method. 4,024,872, Cl. 128-348.000.
Muller, Eckart: *See—*
Reichhardt, Horst Ludwig; Muller, Eckart; and Markwort, Helmut, 4,025,424.
Muller, Manfred; and Schirmag, Klaus-Peter, to Mannesmannrohren-Werke AG. Transverse movement of elongated stock. 4,024,946, Cl. 198-570.000.
Mullins, David Lee: *See—*
Litteral, Carl James; and Mullins, David Lee, 4,025,456.
Munday, John Charles; and McDonald, Andrew, to General Instrument Corporation. Frequency-signalling circuit for a telephone. 4,025,865, Cl. 328-14.000.
Murabito, Frank. Safety for rifle. 4,024,664, Cl. 42-70.00F.
Murao, Atuhiko: *See—*
Yamagishi, Hidehisa; Murao, Atuhiko; and Tsutsumi, Hisao, 4,025,692.
Murdock, Marshall B.; and Bollinger, Howard E., to Broyhill Industries. Corner dovetail joint. 4,025,215, Cl. 403-381.000.
Murli Advani: *See—*
Humphrey, Thomas D.; and Humphrey, John H., 4,024,789.
Murphy, Alan P.; and Kretschmar, Rickey, to Procter & Gamble Company, The. Fabric softening agents. 4,025,444, Cl. 252-8.800.
Muscolino Inventory Service, Inc.: *See—*
Ng, Joseph Sau-Ho; and Sommers, William S., 4,025,766.
Musschoot, Albert, to General Kinematics Corporation. Vibratory sand reclaiming apparatus. 4,025,419, Cl. 209-3.000.
Myers, Paul D.: *See—*
Prisco, Robert C.; and Myers, Paul D., 4,024,892.
Myler, George W.: *See—*
Reid, Edward A., Jr.; Myler, George W.; and Payne, James E., 4,024,839.
Myles, James. Device for heating lather product from a pressurized container. 4,024,987, Cl. 222-146.0HA.
Naegeli, Werner; and Schneider, Antonius, to Pavena AG. Method of producing a dyed and stabilized non-twisted fiber sliver and a fiber sliver with mutually bonded fibers. 4,025,302, Cl. 8-17.000.
Nagai, Shigeki; Yoshida, Hiroshi; and Inoue, Teruhiko, to UBE Industries, Ltd. Process for preparing monoalkyl ethers of dihydric phenols. 4,025,566, Cl. 260-613.00D.

Nagaoka, Seishiro: *See—*
Suzuki, Gyoichi; Ando, Ryo; Yoshikoshi, Hideyuki; Nagaoka, Seishiro; and Yamaoka, Yogiro, 4,025,610.
Nagata, Wataru; Okada, Kyo; Itazaki, Hiroshi; and Aoki, Tsutomu, to Shionogi & Co., Ltd. Production of o-hydroxybenzyl alcohols. 4,025,553, Cl. 260-521.00R.
Nagel, Erich: *See—*
Fleck, Adolf; Gotze, Christian; and Nagel, Erich, 4,025,005.
Nagy, Alexander W.; and Trapani, Giorgio B., to Polaroid Corporation. Polarizer lamination. 4,025,688, Cl. 428-350.000.
Naidich, Jury Vladimirovich; Lavrinenko, Irina Alexandrovna; Kondratsky, Vladimir Afanasievich; Semenov, Jury Nikolaevich; Emelyanov, Boris Mikhailovich; and Kogosov, Leonid Pinkhusovich. Method of producing aggregated abrasive grains. 4,024,675, Cl. 51-296.000.
Nailor, William Kirby, III, to Du Pont de Nemours, E. I., and Company. Battery snap terminal. 4,024,953, Cl. 206-344.000.
Naito, Shotaro; and Katada, Hiroshi, to Hitachi, Ltd. Protective system against commutation failure in a chopper circuit. 4,025,836, Cl. 318-490.000.
Nakabo, Satoru: *See—*
Wada, Tasaku; and Nakabo, Satoru, 4,025,957.
Nakajima, Yoshiji: *See—*
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Nakamura, Michiharu: *See—*
Aiki, Kunio; Hitachi, Ltd.; Nakamura, Michiharu; and Umeda, Jun-ichi, 4,025,939.
Nakamura, Norihiko; and Yanagihara, Hiromichi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Carburetors utilizing an acceleration pump and a method therefor. 4,025,588, Cl. 261-34.00A.
Nakao, Hisaji; Naruse, Katutoshi; Hasegawa, Kazuhiko; Kawade, Sadao; Tokura, Yasufumi; and Matsuno, Kazuo, to Toyoda Koki Kabushiki Kaisha. General purpose sequence controller. 4,025,902, Cl. 340-172.500.
Nakao, Motokazu: *See—*
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Nalco Chemical Company: *See—*
Frisque, Alvin J., 4,025,712.
Nanni, Augusto, to Reagens S.p.A. Industria Chimica. Method of preparing additives and additives prepared according to said method. 4,025,690, Cl. 428-407.000.
Narco Scientific Industries, Inc.: *See—*
Ferrara, John M.; and Smith, Frank Patterson, 2nd, 4,025,923.
Naruse, Katutoshi: *See—*
Nakao, Hisaji; Naruse, Katutoshi; Hasegawa, Kazuhiko; Kawade, Sadao; Tokura, Yasufumi; and Matsuno, Kazuo, 4,025,902.
National Steel Corporation: *See—*
Sorsen, Spencer L., 4,025,024.
Vucich, Michael G.; and Vitellas, Michael X., 4,024,742.
Natta, Giulio; Valvassori, Alberto; Sartori, Guido; and Cameli, Nazzareno, to Montecatini Edison S.p.A. Ethylene-olefin-alkenyl norbornene elastomers. 4,025,497, Cl. 260-79.50B.
Needham, Donald G., to Phillips Petroleum Company. Ultraviolet-stabilized polyolefin compositions. 4,025,582, Cl. 260-897.00R.
Neel, William E., to Beatrice Foods Co. Food extrusion device. 4,025,260, Cl. 425-131.100.
Neidhardt, Helmut. Tubular fabric coated with plastics or synthetic rubbers. 4,025,684, Cl. 428-257.000.
Neiman, S.A.: *See—*
Lipschutz, Paul, 4,025,740.
Nelson, Alfred M., to Cubic Photo Products Division. Multilayer magnetic image recording head. 4,025,927, Cl. 346-74.100.
Nelson, James P.; and Steitz, Alfred, Jr., deceased (by Steitz, Margaret Marie, executrix), to Standard Oil Company (Indiana). Poly(tetramethylene dibromoterephthalate) yarns. 4,025,491, Cl. 260-75.000.
Nestor Engineering Associates, Inc.: *See—*
Slepyan, David H.; and Nestor, Jack, 4,024,859.
Nestor, Jack: *See—*
Slepyan, David H.; and Nestor, Jack, 4,024,859.
Netz, Otto: *See—*
Corte, Herbert; Heller, Harold; Lange, Michael; and Netz, Otto, 4,025,705.
Neuschutz, Heinz, to Ciba-Geigy Corporation. Process for the purification of industrial effluent. 4,025,429, Cl. 210-52.000.
Neuss, Norbert; and Tafur, Susan S., to Eli Lilly and Company. Conversion of leurosine to vincathicine. 4,025,522, Cl. 260-287.00B.
Newage Kitchens Limited: *See—*
Hives, Ronald, 4,025,216.
Newbrough, Joseph S. System for improving oil well production. 4,025,235, Cl. 417-54.000.
Newman, Neil F., to Exxon Research and Engineering Company. Method of covulcanizing chlorinated low unsaturation rubbers with high unsaturation rubber. 4,025,695, Cl. 428-492.000.
Newton, Edward Ray; and Newton, Maria Louise. Infant pet arrival kit. 4,024,880, Cl. 132-79.00F.
Newton, Maria Louise: *See—*
Newton, Edward Ray; and Newton, Maria Louise, 4,024,880.
Newton, Robert A.: *See—*
Steiner, Edwin C.; Newton, Robert A.; and Boer, F. Peter, 4,025,523.
Ng, Joseph Sau-Ho; and Sommers, William S., to Muscolino Inventory Service, Inc. Inventory recordation system and processing. 4,025,766, Cl. 235-152.000.
Nickolson, Robert C.; Kerb, Ulrich; and Wiechert, Rudolf, to Schering Aktiengesellschaft. Novel D-homo steroids. 4,025,563, Cl. 260-586.00E.
Nightingale, Colin Walter; and Bielstein, Georg Paul Richard, to British Copper Refiners Limited. Electrolytic refining of metal. 4,025,413, Cl. 204-252.000.
Nihashi, Yoshiyuki; Horinaka, Ikuho; Senda, Syuichi; Katou, Kazuo; and Sase, Takashi, to Hitachi, Ltd. Method of measuring analog input voltages through isolation transformers and apparatus for the same. 4,025,849, Cl. 324-127.000.
Nimerick, Kenneth H.: *See—*
Parks, Christ F.; and Nimerick, Kenneth H., 4,025,596.
Nippon Dia Clevite Co., Ltd.: *See—*
Morimoto, Toru; and Matsuzawa, Kenji, 4,025,335.
Nippon Electric Company, Ltd.: *See—*
Sawai, Akira, 4,025,730.
Sekikawa, Aisuke; and Aragaki, Takahiko, 4,024,941.
Nippon Electronics Memory Industry Co., Ltd.: *See—*
Hara, Hirohito; and Shimamura, Hironori, 4,025,877.
Nippon Kokan Kabushiki Kaisha: *See—*
Moriguchi, Sanseki; Abe, Hiroshi; Nishida, Taisuke; Takenaka, Jyoichi; Miyazawa, Makoto; and Iwabuchi, Sadayoshi, 4,025,604.
Suzuki, Gyoichi; Ando, Ryo; Yoshikoshi, Hideyuki; Nagaoka, Seishiro; and Yamaoka, Yogiro, 4,025,610.
Yamada, Takeo; Kunioka, Kazuo; Sugiyama, Shunichi; and Teramoto, Toyokazu, 4,024,903.
Yamagishi, Hidehisa; Murao, Atuhiko; and Tsutsumi, Hisao, 4,025,692.
Nippon Paint Co., Ltd.: *See—*
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Takahashi, Mitsuru, 4,025,471.
Nippon Piston Ring Co., Ltd.: *See—*
Kurio, Noriyuki; and Ebihara, Tadashi, 4,025,247.
Nippon Soken, Inc.: *See—*
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Nippondenso Co., Ltd.: *See—*
Fujii, Hideo; and Kato, Minoru, 4,024,844.
Nishida, Taisuke: *See—*
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Nishida, Takashi: *See—*
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Nishide, Katsuhiko: *See—*
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Nishikawa, Yasuo: *See—*
Ueda, Mikio; Kubota, Takeshi; Nishikawa, Yasuo; and Watanabe, Akira, 4,025,460.
Nishimura, Hajime; and Nomura, Yasushi, to Citizen Watch Co., Ltd. Battery construction. 4,025,702, Cl. 429-142.000.
Nissan Chemical Industries, Ltd.: *See—*
Suzuki, Fumio; Tanaka, Mitsuo; and Mera, Yoshiaki, 4,025,526.
Nisshin Kogyo Kabushiki Kaisha: *See—*
Takeuchi, Hiroo, 4,024,712.
Nnadi, John C.; and Heilweil, Israel Joel, to Mobil Oil Corporation. Ether-linked polymers and compositions containing them. 4,025,452, Cl. 252-51.50A.
Noguchi, Matsusaburo: *See—*
Watanabe, Akinori; Tanoshima, Katsuhide; and Noguchi, Matsusaburo, 4,024,811.
Nojiri, Howard Hideo: *See—*
Erwin, Carl Lloyd; Howett, Michael John; and Nojiri, Howard Hideo, 4,025,738.
Nolan, John [illegible]nd Marston, Peter G., to Sala Magnetics, Inc. Flow control un[illegible]r magnetic matrix. 4,025,432, Cl. 210-222.000.
Nomura, Is[illegible] Aisin Seiki Kabushiki Kaisha. Temperature responsive pneum[illegible]ignition timing control device. 4,024,845, Cl. 123-117.00A.
Nomura, Yasushi: *See—*
Nishimura, Hajime; and Nomura, Yasushi, 4,025,702.
Norback, Per, to Aktiebolaget Carl Munters. Method of manufacturing contact bodies. 4,025,668, Cl. 427-227.000.
Norberg, Gayle Russell, to Control Data Corporation. Multi-level clipping circuit. 4,025,803, Cl. 307-237.000.
Nordberg, Svein T.; and Shaner, Donald R., to GTE Sylvania Incorporated. Equipment housing for communication system. 4,025,150, Cl. 339-177.00R.
Nordin, Lars-Gunnar. Valve mechanism. 4,024,714, Cl. 60-572.000.
Nordstrom, Lennart: *See—*
Scholdstrom, Karl Ragnar; Marcus, Holger; Nordstrom, Lennart; and Stahl, Nils, 4,025,192.
Normandin, Michel. Rotary machine with counterweights for interfitted vanes. 4,025,246, Cl. 418-151.000.
Norris Industries, Inc.: *See—*
Weeks, Charles B.; and Choate, Paul V., 4,024,806.
Northwest Engineering Company: *See—*
Schleis, Jerome J., 4,024,957.
Novo Industri A/S: *See—*
Poulsen, Poul Borge Rosenius; and Zittan, Lena Elisabeth, 4,025,389.
Nowak, Hans-Dieter: *See—*
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Amsden, Donald L.; and Nowicki, Casimir W., 4,025,378.

Nozaki Insatsu Shigyo Kabushiki Kaisha: *See*—
Nozaki, Tetsuzo; and Ogawa, Yoshihisa, 4,025,956.
Nozaki, Tetsuzo; and Ogawa, Yoshihisa, to Nozaki Insatsu Shigyo Kabushiki Kaisha. Printing machine. 4,025,956, Cl. 360-2.000.
NRM Corporation: *See*—
Cantarutti, Armindo, 4,025,251.
Nussbaum, Shlomo: *See*—
Cohen, Leonard D.; Kraemer, Erich H.; and Nussbaum, Shlomo, 4,025,881.
Nussbaumer, Henri, to International Business Machines Corporation. Phase-directed decision feedback equalizer. 4,025,719, Cl. 178-67.000.
Nyman, Gustaf Arthur; and Savo, Gote, to Anstalt Gemass. Method for continuous hydrolysis of pentose containing material and apparatus for implementing the method. 4,025,356, Cl. 127-1.000.
O. M. Scott & Sons Company: *See*—
Goertz, Harvey Maurice, 4,025,329.
Oades, John Willson, to GTE Automatic Electric Laboratories Incorporated. In-service technique for measuring transmission characteristics of a microwave radio link. 4,025,854, Cl. 325-67.000.
Obana, Sachio: *See*—
Sunamori, Takashi; and Obana, Sachio, 4,025,828.
Obendorf, Werner; Lindner, Irmgard; Schwarzinger, Ernst; and Krieger, Josef, to Chemie Linz Aktiengesellschaft. Derivatives of triiodoaminobenzenecarboxylic acids and the preparation thereof. 4,025,550, Cl. 260-518.00A.
Oberthuer, Heinrich, to ITT Industries, Inc. Brake force regulator for dual brake circuit system. 4,025,123, Cl. 303-6.00R.
O'Brien Corporation, The: *See*—
Huemmer, Thomas F.; and Edison, Bruce A., 4,025,548.
Occidental Petroleum Corporation: *See*—
French, Gordon B.; and Ridley, Richard D., 4,025,115.
Oce-van der Grinten N.V.: *See*—
Linthout, Theodoor Hillebrand, 4,024,885.
Oda, Minoru: *See*—
Arima, Sumitaro; Oda, Minoru; Miyashita, Kyoichi; and Takada, Mamoru, 4,025,788.
Oda, Yoshio; Uchida, Keiichi; Suhara, Manabu; and Morimoto, Takeshi, to Asahi Glass Co., Ltd. Process for preparing unsaturated aldehyde having three to four carbon atoms. 4,025,565, Cl. 260-604.00R.
Odell, Norman R.: *See*—
Mead, Theodore C.; McDill, Richard T.; Chesluk, Ralph P.; and Odell, Norman R., 4,025,583.
Offshore Company, The: *See*—
Roche, Joseph R.; and Bryant, Frank Allan, 4,024,718.
Ogawa, Yoshihisa: *See*—
Nozaki, Tetsuzo; and Ogawa, Yoshihisa, 4,025,956.
Ogura, Haruo; and Takahashi, Hiroshi, to Ogura, Haruo. Novel sugar ureide and thioureide derivatives. 4,025,622, Cl. 424-180.000.
Ohmori, Shiroh: *See*—
Kobayashi, Kazuo; Ohmori, Shiroh; Hasuda, Tetsuhiko; Shiraishi, Minoru; and Arai, Satoshi, 4,025,689.
Ohno, Kunio: *See*—
Tsuda, Nobuaki; Inagaki, Kenji; Imamiya, Tamotu; Ohno, Kunio; and Mizoguchi, Yoshiyuki, 4,025,436.
Ohuchi, Nobutoshi. Locating apparatus. 4,025,858, Cl. 318-673.000.
Oizumi, Hiroshi: *See*—
Yamashita, Mitsuo; Mikogami, Akio; Hasegawa, Masashi; and Oizumi, Hiroshi, 4,025,464.
Okabe, Harunori: *See*—
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Okada, Kyo: *See*—
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Okagawa, Fumihiko: *See*—
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Oki Electric Industry Company, Ltd.: *See*—
Watanabe, Akinori; Tanoshima, Katsuhide; and Noguchi, Matsusaburo, 4,024,811.
Okuhara, Shinzi: *See*—
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O'Leary, Kevin J.: *See*—
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Olin Corporation: *See*—
Mendiratta, Sudhir K.; Dotson, Ronald L.; and Shipley, George M., 4,025,545.
Parikh, Prakash D.; and Shapiro, Eugene, 4,025,367.
Whitman, Hobart A., III, 4,025,752.
Olivie, Jacques, to Akzona Incorporated. Synthesis for the preparation of tetracyclic compounds. 4,025,513, Cl. 260-251.00A.
Olympia Werke AG: *See*—
Zander, Michael; and Schicht, Rudolf, 4,025,899.
Olympus Optical Co., Ltd.: *See*—
Ikeda, Yoshitsugi, 4,025,167.
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O'Neal, Cothburn M., to Riverside Press, Inc. Voting machine with punch card attachment. 4,025,040, Cl. 234-1.000.
O'Neil, Fred; O'Neil, Louise; and Ward, Paul S., to Champion International Corporation. Assembly device mounting sticks into food. 4,025,032, Cl. 227-141.000.
O'Neil, Louise: *See*—
O'Neil, Fred; O'Neil, Louise; and Ward, Paul S., 4,025,032.
Ono, Hiroshi: *See*—
Shibayama, Kyoichi; Ono, Hiroshi; Jidai, Eiki; and Saeki, Hideo, 4,025,037.
Ooishi, Tadashi: *See*—
Kirino, Osamu; Ooishi, Tadashi; Kameda, Nobuyuki; Kato, Toshiro; Ozaki, Toshiaki; and Fujinami, Akira, 4,025,651.
Ordonez, Guido A.: *See*—
Garcia, Luis A.; and Ordonez, Guido A., 4,025,500.
Orima, Isamu; Sone, Hitoshi; and Sone, Kiyoshi, to Ricoh Co., Ltd. Jitter prevention system for video signal processing. 4,025,958, Cl. 360-73.000.
Orlando, Matthew R., to Mobil Oil Corporation. Method and apparatus for simple field test to determine final boiling point of a volatile liquid sample. 4,024,752, Cl. 73-17.00A.
Orzalesi, Henri Ange, to Societe Civile de Recherches et d'Etudes Nouvelles (S.C.R.E.E.N.). 3-(4'-Alkoxy-benzoyl)-1,2,2-trimethylcyclopentane-carboxylic acids, methods of use and compositions containing such compounds. 4,025,552, Cl. 260-520.00E.
Osmundson, John Sigfred: *See*—
United States of America, National Aeronautics and Space Administration; and Osmundson, John Sigfred, 4,025,875.
Ostapko, Daniel L.: *See*—
Cox, Dennis T.; Hong, Se J.; and Ostapko, Daniel L., 4,025,799.
Oswald, Anton H., to Bright Star Industries, Inc. Three position flashlight switch. 4,025,743, Cl. 200-60.000.
Oswald, Hendrikus Johan: *See*—
Li, Hsin Lang; Liland, Alfred Louis; and Oswald, Hendrikus Johan, 4,024,610.
Li, Hsin Lang; Liland, Alfred Louis; and Oswald, Hendrikus Johan, 4,024,611.
Ott, Hubert: *See*—
Hendrischk, Wolfgang; Ott, Hubert; Seybold, Wolfgang; Heisele, Horst; and Mayr, Karl, 4,024,940.
Ouvrard, Paul, to Societe Anonyme dite: Antar Petroles de l'Atlantique. Method and apparatus for the continuous automatic analysis of the crystallization point of liquid substances. 4,024,753, Cl. 73-17.00R.
Owen, Kenneth. Remote control means for a balanced line switch system. 4,025,746, Cl. 200-179.000.
Owens, Ben Howard; LeFevre, Clyde Eugene; and Hagan, James Patrick, to Addressograph Multigraph Corporation. Microfiche viewer. 4,025,177, Cl. 353-27.00A.
Owens-Corning Fiberglas Corporation: *See*—
Zion, Earl M., 4,025,686.
Owens-Illinois, Inc.: *See*—
Amberg, Stephen W., 4,025,381.
Amsden, Donald L.; and Nowicki, Casimir W., 4,025,378.
Frank, Charles A., 4,024,836.
Greenstein, Bernard, 4,025,669.
Martel, Richard A.; and Salisbury, Charles W., 4,024,613.
Taylor, Lynn J., 4,025,580.
Uhlig, Albert R., 4,024,975.
Oy Fiskars AB: *See*—
Linden, Erkki Olavi, 4,024,634.
Oy Keskuslaboratorio-Centrallaboratorium AB: *See*—
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P. R. Mallory & Co., Inc.: *See*—
Fagan, Franklin G., Jr.; and Angelovich, Stephen J., 4,025,700.
Pachynski, Alvin L., Jr., to GTE Automatic Electric Laboratories Incorporated. Digital bit rate converter. 4,025,720, Cl. 178-69.100.
Pagel, Richard F., to Amax Inc. Removal of metal ions from waste water. 4,025,430, Cl. 210-53.000.
Pako Corporation: *See*—
Gaskell, Alfred J., 4,024,649.
Paramonov, Vadim Ivanovich: *See*—
Balinov, Igor Mikhailovich; Samsonov, Georgy Nikiforovich; Balykov, Vladimir Mikhailovich; Paramonov, Vadim Ivanovich; and Demyashkin, Nikolai Mikhailovich, 4,025,120.
Paretti, Claudio R., to Comitato Nazionale per l'Energia Nucleare. Method and apparatus for recording in a memory trajectories and traces of objects. 4,025,718, Cl. 358-280.000.
Parikh, Prakash D.; and Shapiro, Eugene, to Olin Corporation. Process

for treating copper alloys to improve thermal stability. 4,025,367, Cl. 148-11.50C.
Park, George C.; and Porter, Arthur B., to Bolton-Emerson, Inc. Drum unloading apparatus and method. 4,024,854, Cl. 126-343.50A.
Parker, Alfred B.: *See—*
Scragg, Robert L.; and Parker, Alfred B., 4,024,715.
Parker Drilling Company, Inc.: *See—*
Houck, Theodore B., 4,024,924.
Parker, Francis F., to United States of America, Navy. Constant current base-drive circuit. 4,025,843, Cl. 323-22.00T.
Parks, Christ F.; and Nimerick, Kenneth H., to Dow Chemical Company, The. Method for pelletizing finely divided solids. 4,025,596, Cl. 264-117.000.
Parr, David Turner, to Bicc Limited. Jointing or terminating plastics sheathed electric cables. 4,025,600, Cl. 264-262.000.
Parsons, John Henry, to Fisons Limited. Acaricidal pyridinium salts. 4,025,632, Cl. 424-263.000.
Pasco, William R.: *See—*
Young, William E.; Wolfelsperger, Robert O.; and Pasco, William R., 4,024,692.
Patejak, Jerzy F., to Aetna-Standard Engineering Company. Flying rotary saw. 4,024,780, Cl. 83-306.000.
Patentkonsortiet Robert Meinich & Co.: *See—*
Bergersen, Hans Amund, 4,025,893.
Patterson, W. W., III; and Grapes, Eugene F. Clamps for wire rope, rods and tubes. 4,025,052, Cl. 254-76.000.
Pavement Systems, Inc.: *See—*
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Pavena AG: *See—*
Naegeli, Werner; and Schneider, Antonius, 4,025,302.
Pavlak, Alex: *See—*
L'Esperance, Paul M.; and Pavlak, Alex, 4,024,852.
Pavlica, Robert T., to Mobil Oil Corporation. Hydroprocessing catalytic cracking feed stocks. 4,025,417, Cl. 208-57.000.
Payne, George Bernson, to Shell Oil Company. N-(arylsulfonyl)-alpha-nitro-delta $^{2\text{-ethylene}}$-piperidineacetamides. 4,025,634, Cl. 424-267.000.
Payne, James E.: *See—*
Reid, Edward A., Jr.; Myler, George W.; and Payne, James E., 4,024,839.
Payne, Philip W. Diver's fish spear. 4,024,665, Cl. 43-6.000.
Pecha, Ernst, to Bielomatik Leuze & Co. Welding containers. 4,025,371, Cl. 156-64.000.
Peck, Theodore H., to Bausch & Lomb Incorporated. Apparatus for parfocalizing objectives. 4,025,171, Cl. 350-255.000.
Pecka, Jan: *See—*
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Marek, Miroslav; Toman, Ludek; and Pecka, Jan, 4,025,403.
Pedersen, Robert O.: *See—*
Chambers, Derek; and Pedersen, Robert O., 4,025,841.
Peerts, Fernand; and DeLaunois, Yvon, to Tessenderlo Chemie S.A. Preparation of organic polysulfide polymers using heavy residues from vinylchloride manufacture. 4,025,495, Cl. 260-79.100.
Peikert, Juergen, to Messerschmitt-Bolkow-Blohm GmbH. Intake control for air utilizing aircraft engines. 4,025,008, Cl. 244-53.00B.
Peil, William, to General Electric Company. Audio amplifier for integrated circuit fabrication having controlled idling current. 4,025,871, Cl. 330-22.000.
Pekala, Charles T. Sports (back) seat. 4,025,105, Cl. 297-4.000.
Pellerin, William F.; and Lovely, Stephen C., to Sprague Electric Company. Electrolytic capacitor having a highly strained elastomeric sealing element. 4,025,827, Cl. 361-433.000.
Pelletier, James Paul: *See—*
Forrest, Alan Wayne; and Pelletier, James Paul, 4,024,911.
Pelz, David T. Attachment for a golf club. 4,025,078, Cl. 273-186.00A.
Pendell, Larry Stuart. Method of forming flat multiple-sided fastener parts having an opening therein. 4,024,593, Cl. 10-86.00R.
Pendergast, Daniel O., to Jet Research Center, Inc. Bonding explosive fillers with anaerobic curing binders. 4,025,591, Cl. 264-3.00R.
Pennwalt Corporation: *See—*
MacLeay, Ronald Edward; and Sheppard, Chester Stephen, 4,025,502.
Penrock, William B. Prosthetic brassiere. 4,024,876, Cl. 128-472.000.
Penrod, John K., to Power Management Corporation. Contactor device including arc supression means. 4,025,820, Cl. 361-8.000.
Perkins, William Clarence: *See—*
Maggiulli, Cataldo Aldino; Burness, Donald MacArthur; and Perkins, William Clarence, 4,025,542.
Perlman, David; Sylvestre, Michel Alfred; and Sakai, Takuo, to Wisconsin Alumni Research Foundation. Broad spectrum antibiotics. 4,025,619, Cl. 424-115.000.
Perrault, Marcel, to Serdex - Societe d'Etudes, de Recherches, de Diffusion et d'Exploitation. 6-(Trifluoromethyl)-benzothiadiazines. 4,025,508, Cl. 260-243.00D.
Perry, Jack A. Waste water sampling system. 4,024,766, Cl. 73-422.00R.
Persson, Jan. Conveyor track apparatus for logs. 4,024,948, Cl. 198-796.000.
Pervel Industries, Inc.: *See—*
Frank, Robert J., 4,025,678.
Peter, Bernd; and Schmidt, Peter Jurgen, to Robert Bosch GmbH. Internal combustion engine monitor system. 4,024,850, Cl. 123-198.00F.
Peters, Donald L., to Phillips Petroleum Company. Blow molding apparatus. 4,025,276, Cl. 425-387.00B.
Petersen, Raymond R.: *See—*
Eberhardt, H. Alfred; Hoffman, Kenneth F.; and Petersen, Raymond R., 4,024,886.
Peterson, Wayne A.: *See—*
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Peterson, William J., Jr.: *See—*
Kleysteuber, William K.; and Peterson, William J., Jr., 4,024,949.
Petitpierre, Jean-Claude, to Ciba-Geigy Corporation. Pressure-sensitive or heat-sensitive recording material. 4,025,090, Cl. 282-27.500.
Petitpierre, Jean-Claude: *See—*
Garner, Robert; and Petitpierre, Jean-Claude, 4,025,089.
Petke, Frederick Edward; Kirch, John Nicholas; and Gerkin, Michael Edward, to Borden, Inc. Plates comprising a photopolymerizable composition coated on a substrate. 4,025,346, Cl. 96-86.00P.
Petro-Tex Chemical Corporation: *See—*
Croce, Louis J.; Bajars, Laimonis; and Gabliks, Maigonis, 4,025,461.
Petrocci, Alfonso N.: *See—*
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., 4,025,617.
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., 4,025,627.
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., 4,025,653.
Pezzoli, Paul A.; and Spangenberg, Stanley F., to Dow Chemical Company, The. Process to produce barium and strontium ferrite. 4,025,449, Cl. 252-62.630.
Pfisterer, Horst: *See—*
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Pfizer Inc.: *See—*
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Hamanaka, Ernest S.; and Stam, John G., 4,025,506.
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Jurrens, Lawrence D., 4,025,478.
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Warner, Paul F., 4,025,643.
Pi, Ching-Tien. Fastener for motorcycle driver's helmet. 4,024,738, Cl. 70-59.000.
Piascinski, Joseph John: *See—*
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Pickard, Gillian Susan: *See—*
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Pickard, John Frederick; and Pickard, Gillian Susan, to Montrose Properties Limited. Fire escape installation. 4,024,928, Cl. 182-19.000.
Pierce, Donald Cameron. Coloring cardboard picture mats with dry powder. 4,025,666, Cl. 427-197.000.
Pierrot, Francis: *See—*
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Pilgrim, William Robert: *See—*
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Plasmine Corporation: *See—*
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Plasson Maagan Michael Industries Limited: *See—*
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Plasti-Drum Inc.: *See—*
Craig, Walter J.; Lewis, Walter K.; and Bailey, Rondell L., 4,024,979.
Platsch, Hans Georg, to Firm Albin Platsch. Device for spraying powder. 4,024,815, Cl. 101-416.00R.
Pleasantaire Industries, Ltd.: *See—*
Goodwin, Vernon, Jr., 4,025,325.
Pletcher, Wayne A.; and Vermillion, Russell L., to Minnesota Mining and Manufacturing Company. Magnetic recording medium having segmented copolyester binder. 4,025,694, Cl. 428-480.000.
Plonsker, Larry; and Malec, Robert E., to Ethyl Corporation. Sulfurized mannich bases as lubricating oil dispersant. 4,025,451, Cl. 252-47.500.
Plozner, Lisio, to Elpinvest S.A. Gas lamp igniter device. 4,025,288, Cl. 431-255.000.
Podolsky, Leaman: *See—*
Giras, Theodore C.; and Podolsky, Leaman, 4,025,765.
Polaert, Remy Henri Francois; Ducarre, Alphonse; Duchenois, Valere Dominique Louis; and Rodiere, Jean, to U.S. Philips Corporation. Method of manufacturing microchannel plate having rounded input faces. 4,025,328, Cl. 65-111.000.
Polaert, Remy Henri Francois: *See—*
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Polaroid Corporation: *See—*
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Levy, Boris, 4,025,343.
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Pollak, Zsuszanna B.: *See—*
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Polysar Limited: *See—*
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Polythetics, Inc.: *See—*
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Polz, Victor I.: *See—*
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Pominski, Joseph; and Spadaro, James J., to United States of America, Agriculture. Milk-like products from peanuts. 4,025,658, Cl. 426-598.000.

Pompei, Jean; Lacroix, Bernard; and Pierrot, Francis, to U.S. Philips Corporation. Probe for detecting gaseous polar molecules such as water vapor. 4,025,892, Cl. 338-35.000.

Pond, C. Ray; Robinson, Lawrence W.; and Texeira, Patrick D., to Boeing Company, The. Apparatus suitable for use in orienting aircraft in-flight for refueling or other purposes. 4,025,193, Cl. 356-5.000.

Pontiac Furniture Industries, Inc.: *See—*
Johnson, Carl B., 4,025,210.

Pook, Ian Michael; and Lee, George Herbert. Burgees. 4,024,833, Cl. 116-173.000.

Poorman, R. William, to International Harvester Company. Suspension seat safety belt mounting. 4,025,110, Cl. 297-385.000.

Poque, Dionysius Josef, to Uniroyal A.G. Lower sidewall reinforcement for pneumatic tires. 4,024,901, Cl. 152-354.000.

Porcelli, Joseph J.: *See—*
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Pornin, Rene; Blanc, Jean-Henri; and Voirin, Robert, to Societe Nationale Elf Aquitaine (Production). Hydrophilic modified acrylic polymers particularly hydrodispersible or hydrosoluble modified acrylic polymers and method of preparing the same. 4,025,703, Cl. 526-16.000.

Porter, Arthur B.: *See—*
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Porter, Samuel, Jr.; and McBane, Bruce N., to PPG Industries, Inc. Polyester coating compositions comprising cross-linked polymeric microparticles. 4,025,474, Cl. 260-22.0CQ.

Portlock, David Edward, to Sharps Associates. Method of preparing $\beta$-dihydrothebaine. 4,025,521, Cl. 260-285.000.

Portmann, Hubert; Droz, Willy; and Beguin, Jean-Luc, to Ebauches S.A. Control and correction circuit for an electronic watch. 4,024,678, Cl. 58-23.00R.

Poss, Werner: *See—*
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Potrzebowski, Anthony C., to Betz Laboratories, Inc. Apparatus for determining heat transfer efficiency. 4,024,751, Cl. 73-15.00R.

Potts, Vinson S.: *See—*
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Poulsen, Poul Borge Rosenius; and Zittan, Lena Elisabeth, to Novo Industri A/S. Process and isomerizing glucose. 4,025,389, Cl. 195-31.00F.

Powaska, Tadeusz. Bumper assembly for a motor vehicle. 4,025,098, Cl. 293-30.000.

Powell, John A.; and Williams, Alan, to Rohm and Haas Company. Barrier resins and impact modifiers therefor. 4,025,581, Cl. 260-880.00R.

Power Management Corporation: *See—*
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Powers, Richard G.: *See—*
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PPG Industries, Inc.: *See—*
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Drummond, Warren W., 4,024,700.
Lackore, James K.; and Ramler, Warren J., 4,025,795.
Porter, Samuel, Jr.; and McBane, Bruce N., 4,025,474.
Schaefer, William L., 4,024,647.
Sutton, John C., III; and Summerlin, Jerry J., 4,025,002.

Prazak, Gerald, to Westvaco Corporation. Dyestuff compositions containing modified sulfonated lignin dye dispersants. 4,025,303, Cl. 8-28.000.

Predmore, Clayton Read, to Associated Universities, Inc. Waveguide coupler having helically arranged coupling slots. 4,025,878, Cl. 333-10.000.

Presby, Herman Melvin: *See—*
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Prescott, Norman F.; and Cook, Herbert, to Atwood & Morrill Co. Closing assist for valves. 4,024,884, Cl. 251-38.000.

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Presto Lock Company, division of Walter Kidde & Company, Inc.: *See—*
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Prevot, Claude: *See—*
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Price, Luther A.; and Bryla, Theodore N., to United States of America, Navy. Deflagrative epoxy foam material. 4,025,369, Cl. 149-19.600.

Prisco, Robert C.; and Myers, Paul D., to Microdot, Inc. Valve for use in a nut installation tool. 4,024,892, Cl. 137-630.140.

Priska, Martin T.; and Ringquist, Russell V., to Miller, Gustave; Priska, Martin T.; and Ringquist, Russel V. Wildcat oil well drilling game. 4,025,075, Cl. 273-135.0AB.

Prismo Universal Corporation: *See—*
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Procter & Gamble Company, The: *See—*
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Produits Chimiques Ugine Kuhlmann: *See—*
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Projectus Industriprodukter AB: *See—*
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Pryor, Cabell Nicholas, Jr.: *See—*
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Pugh, James: *See—*
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Pugsley, Peter C., to Crosfield Electronics Limited. Preparation of half-tone images. 4,025,189, Cl. 355-38.000.

Pujol, Luis, to Exxon Production Research Company. Technique for insulating a wellbore with silicate foam. 4,024,919, Cl. 166-303.000.

Pullman Incorporated: *See—*
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Pulp and Paper Research Institute of Canada: *See—*
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Pundsack, Arnold L., to Xerox Corporation. Camera/processor/projector and sub-systems. 4,025,183, Cl. 355-5.000.

Purdy, Clarence L. Method of curing and providing immunity from viral infections. 4,025,621, Cl. 424-127.000.

Putzke, James J., to Medtronic, Inc. Device for non-invasive programming of implanted body stimulators. 4,024,875, Cl. 128-419.0PG.

Pyott-Boone, Inc.: *See—*
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Quasar Electronics Corporation: *See—*
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Quehen, Andre, to Secim. Deflector roll for measuring and checking the flatness of sheet metal stretched in motion. 4,024,755, Cl. 73-105.000.

Quick, Kenneth L.; and Blevins, Dennis R., to Electrical Utilities Company. Self-locking terminal assembly. 4,025,714, Cl. 174-18.000.

Rabinow, Jacob; and Boyd, William Hunter A., to United States of America, Army. Rocket. 4,024,998, Cl. 244-3.260.

Racunas, Bernard J.; Kastelic, Raymond; Proctor, William L., Jr.; and Moretz, George E., to Aluminum Company of America. Liquid fuel vaporizer device for baking furnace. 4,025,287, Cl. 431-189.000.

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Radler, Richard W., Jr.; and Millonzi, Richard P., to Xerox Corporation. Photoactive device for xerography. 4,025,188, Cl. 355-16.000.

Radzins, Edmund A.: *See—*
Hirsch, John L.; and Radzins, Edmund A., 4,025,373.

Raess, Ulrich; Jaeger, Hans; and Anderes, Max, to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG. Gear testing machine. 4,024,757, Cl. 73-162.000.

Raganato, Carlo; and Voituron, Georges, to Solvay & Cie. Fabrication of discontinuous fibrils. 4,025,593, Cl. 264-94.000.

Ragir, Meyer J.; and Olen, George R., to Ragir, Meyer J. Apparatus for forming support device. 4,025,258, Cl. 425-123.000.

Raider, Jerry Wesley: *See—*
Meier, Johann Hans; and Raider, Jerry Wesley, 4,025,837.

Rain, Lloyd H.; and McLorg, Terence W., to Irvin Industries, Inc. Air supported structure membrane configuration. 4,024,679, Cl. 52-2.000.

Ralston Purina Company: *See—*
Cho, Iue Chung; and Kolar, Charles W., Jr., 4,025,659.

Ramig, Alexander, Jr., to SCM Corporation. Stabilizing aqueous titanium dioxide pigment slurries by blending therewith plastic particles. 4,025,483, Cl. 260-29.6MM.

Ramler, Warren J.: *See—*
Lackore, James K.; and Ramler, Warren J., 4,025,795.

Ramot University Authority for Applied Research and Industrial Development Ltd.: *See—*
Deutscher, Siegfried Guy, 4,025,844.

Ramsey Corporation: *See—*
McCormick, Harold E., 4,024,617.

Randolph, Alan; Drach, George; and Miller, John Daniel, to University Patents, Inc. Method and apparatus for determining crystallization properties of urine. 4,025,307, Cl. 23-230.00B.

Randolph, Robert W.; and Jantzen, Steven L., to ACF Industries, Incorporated. Flux backup arrangement for circumferential welding. 4,025,034, Cl. 228-41.000.

Ranger, Jean Bernard: *See—*
Joly, Jean; and Ranger, Jean Bernard, 4,025,404.

Rank Xerox Ltd.: *See—*
Horie, Kiyoshi, 4,024,838.

Ransom, Donald D., to Allis-Chalmers Corporation. Positive mechanical lock-out device. 4,025,742, Cl. 200-48.00R.
Rapps, John W. Spring hanger assembly. 4,025,011, Cl. 248-54.00R.
Rasmussen, Chris Royce, to McNeil Laboratories, Incorporated. 4-Oxo-2-hexahydropyrimidinylidene ureas. 4,025,517, Cl. 260-256.40C.
Rath, Richard M.: *See—*
Kochevar, Joseph F.; Rath, Richard M.; and Claffey, Walter W., 4,025,231.
Ray, Robert W., Jr.: *See—*
Koenig, William P.; and Ray, Robert W., Jr., 4,024,644.
Ray, William A. Electrical ignition systems for gas fired equipment. 4,025,283, Cl. 431-45.000.
Raymond Lee Organization, Inc., The: *See—*
Anantharaman, Muthuvaramadam K., 4,025,013.
Bintz, Donald H., 4,025,081.
Fouracre, Roy E., 4,024,597.
Gamboa, Carlos E., 4,024,599.
Latham, Otis D., 4,024,999.
Lummus, J. Frank, 4,025,082.
Martucci, Frank C., 4,025,139.
Snyder, Wayne M., 4,024,654.
Raymond, Russell J.: *See—*
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Raytheon Company: *See—*
Chambers, Derek; and Pedersen, Robert O., 4,025,841.
Razdan, Raj Kumar; and Dalzell, Haldean Cloyce, to John C. Sheehan Institute for Research, Inc., The. Process for the preparation of (−)-6a,10a-trans-6a,7,8,10a-tetrahydrodibenzo[b,d]-pyrans. 4,025,516, Cl. 260-345.300.
RCA Corporation: *See—*
Bridgewater, Thomas Austin St. Clair, 4,025,945.
Crowle, Brian, 4,025,842.
Moscony, John Joseph; and Piascinski, Joseph John, 4,025,661.
Warren, Henry Ray, 4,025,959.
Reade, Ray O.: *See—*
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Reagens S.p.A. Industria Chimica: *See—*
Nanni, Augusto, 4,025,690.
Reber, Tony: *See—*
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Reed, John Anthony: *See—*
Karp, Joel Allen; and Reed, John Anthony, 4,025,907.
Reed Manufacturing Co., Inc.: *See—*
Diemert, Paul M., 4,025,122.
Reed, Robert D.; and Goodnight, Hershel, to John Zink Company. Apparatus to burn liquid fuels in a gaseous fuel burner. 4,025,282, Cl. 431-11.000.
Reed, Robert R.: *See—*
Durant, Donald S., 4,025,225.
Reese, Johannes: *See—*
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Regal Tool & Rubber Co. Inc.: *See—*
Mayfield, Windel O.; Thomerson, Clarence T.; and Waldrop, Tom C., 4,024,723.
Reibel, Robert H.: *See—*
Martinez, Eugene, 4,025,160.
Reichhardt, Horst Ludwig; Muller, Eckart; and Markwort, Helmut, to Metallgesellschaft Aktiengesellschaft. Process and apparatus for liquid-liquid counterflow extraction. 4,025,424, Cl. 210-23.00R.
Reid, Edward A., Jr.; Myler, George W.; and Payne, James E., to Columbia Gas System Service Corporation. Gas-fired smooth top range. 4,024,839, Cl. 126-39.00J.
Reifel, Charles: *See—*
Leasure, William; Garcia, Luis; Reifel, Charles; and Shelton, Jack, 4,024,693.
Reifers, Richard F.; Bixler, Kenneth D.; and Lord, Henry A., to Diamond International Corporation. Egg carton. 4,025,038, Cl. 229-2.5EC.
Reinders, Donald D., to Acro Products, Inc. Mold structure and cavity forming insert arrangement therefor. 4,025,269, Cl. 425-249.000.
Reinnagel, Richard E. Method of forming copy resistant documents by forming an orderly array of fibers extending upward from a surface, coating the fibers and printing the coated fibers and the copy resistant document resulting from said method. 4,025,673, Cl. 428-29.000.
Reisacher, Josef. High speed lubricated bearing. 4,025,134, Cl. 308-122.000.
Reitboeck, Heribert J. P.; and Brody, Thomas P., to Westinghouse Electric Corporation. Identification of radar systems. 4,025,920, Cl. 343-5.0DP.
Rembault, Michel, to Thomson-CSF. Optical record, and associated recording and reading-out devices. 4,025,731, Cl. 179-100.40R.
Rembold, Helmut, to Robert Bosch G.m.b.H. Wheel lock-up prevention apparatus. 4,025,127, Cl. 303-118.000.
Renk, Richard J.; and Boller, George E., to Miller, Gladys D. Traction motor suspension bearing lubrication. 4,025,079, Cl. 277-220.000.
Renzing, Otto: *See—*
Lanfermann, Willy; and Renzing, Otto, 4,025,118.
Replacement Products Industries Corporation: *See—*
Collins, David R.; and Katz, Sheldon N., 4,024,690.
Rescue Products, Inc.: *See—*
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Research Frontiers, Incorporated: *See—*
Saxe, Robert L.; Thompson, Robert I.; and Forlini, Matthew, 4,025,163.
Reuland, Joachim, to Hauni-Werke Korber & Co., KG. Apparatus for monitoring rod-shaped commodities in cigarette making machines or the like. 4,025,770, Cl. 250-223.00R.
Reuschel, Konrad: *See—*
Martin, Joachim; Haas, Ernst; Reuschel, Konrad; and Schnoller, Manfred, 4,025,365.
Revcor, Inc.: *See—*
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Reynolds, John N.: *See—*
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Reynolds Printasign Company: *See—*
Thiene, Carl G., deceased; and Smith, Henry, 4,024,813.
RFL Industries, Inc.: *See—*
Chlupsa, John Rudolph Matthew, 4,025,736.
Rhone-Poulenc-Textile: *See—*
Vaginay, Yves, 4,025,300.
Ric-Wil, Incorporated: *See—*
Zeile, George David, Jr., 4,025,091.
Rice, John H., to United States of America, Navy. Method and apparatus for remotely transducing and transmitting pressure and temperature changes. 4,025,912, Cl. 340-189.00M.
Richard Wolf GmbH: *See—*
Bonnet, Ludwig, 4,024,869.
Richards, William D. C.; Lilly, James L.; and Gray, Lawrence E., to General Electric Company. Radially extended vapor inlet for a rotary multivaned expander. 4,025,248, Cl. 418-184.000.
Richardson, Hubert, Jr.; and Carter, Thomas W., to Carrier Corporation. Reciprocating compressors. 4,025,239, Cl. 417-292.000.
Richter, Eike: *See—*
Brissey, George Edward; and Richter, Eike, 4,025,840.
Rickard, Jimmy R., to Tappan Company, The. Microwave oven control with mechanical switch lock-out. 4,025,804, Cl. 307-141.000.
Ricoh Co., Ltd.: *See—*
Miyagawa, Fumihiro, 4,025,932.
Mochizuki, Manabu, 4,025,184.
Orima, Isamu; Sone, Hitoshi; and Sone, Kiyoshi, 4,025,958.
Sue, Takaji, 4,025,066.
Ridgway Steel Fabricators, Inc.: *See—*
Cleer, Clarence W., Jr., 4,025,043.
Ridley, Richard D.: *See—*
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Ries GmbH Bekleidungsverschlussfabrik: *See—*
Spindler, Siegfried Wolfram; and Kohler, Manfred Rudi, 4,025,374.
Rifi, Mahmoud Rashad, to Union Carbide Corporation. Process for producing water-dilutable coating compositions. 4,025,473, Cl. 260-19.00R.
Riikonen, Douglas L., to Honeywell Information Systems, Inc. Apparatus for identifying the type of devices coupled to a data processing system controller. 4,025,906, Cl. 340-172.500.
Rindfuss, Anne: *See—*
Kleemann, Axel; Kolb, Heinz; Rindfuss, Anne; Schreyer, Gerd; Schworzer, Ludwig-Karl; and Schuster, Gregor, 4,025,540.
Ringfeder GmbH: *See—*
Schafer, Horst-Dieter; Witzel, Manfred; Loosen, Paul; and Haarkotter, Hermann, 4,025,213.
Ringquist, Russel V.: *See—*
Priska, Martin T.; and Ringquist, Russell V., 4,025,075.
Ringquist, Russell V.: *See—*
Priska, Martin T.; and Ringquist, Russell V., 4,025,075.
Rioux, Philip Joseph, to Motorola, Inc. Apparatus for cleaning slices of material. 4,024,596, Cl. 15-21.00D.
Risdon Manufacturing Company, The: *See—*
Starrett, Rupert M., 4,024,988.
Risseeuw, Paul, to Akzona Incorporated. Reinforced road foundation and method for making said road foundation. 4,024,719, Cl. 61-50.000.
Ritter, Joseph J.: *See—*
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Riverside Press, Inc.: *See—*
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Robakovsky, Yaroslav Nikolaevich: *See—*
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Robbins & Myers, Inc.: *See—*
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Robert Bosch GmbH: *See—*
Adler, Karl-Heinz; Drews, Ulrich; Gloss, Erwin; and Kugelmann, Adolf, 4,024,843.
Beckers, Hans, 4,025,270.
Klinger, Helmut; and Glauert, Wolfram, 4,024,759.
Peter, Bernd; and Schmidt, Peter Jurgen, 4,024,850.
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Schmidt, Peter Jurgen; and Kizler, Harald, 4,024,707.

Robert McGregor & Sons Limited: *See*—
Cochrane, Kenneth Alfred, 4,025,217.
Roberts, William Walter, Jr., to Mobil Oil Corporation. Dirty fluid flow meter. 4,024,762, Cl. 73-228.000.
Robertshaw Controls Company: *See*—
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Robinson, Lawrence W.: *See*—
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Robinson, Timothy G. F.: *See*—
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Roblin Industries, Inc.: *See*—
Hansen, Barton G.; Goetz, Charles P.; and Gasper, John A., 4,024,691.
Roche, Joseph R.; and Bryant, Frank Allan, to Offshore Company, The. Subsea cable apparatus and method of handling same. 4,024,718, Cl. 61-69.00R.
Rock, Erwin H.: *See*—
Klar, Irwin; and Rock, Erwin H., 4,025,733.
Rockwell International Corporation: *See*—
Abbey, Duane L., 4,025,874.
Rodenbaugh, Ralph, to Deco Coatings Corporation. Electrical connector for carpet seaming tape. 4,025,153, Cl. 339-255.00R.
Rodiere, Jean: *See*—
Polaert, Remy Henri Francois; Ducarre, Alphonse; Duchenois, Valere Dominique Louis; and Rodiere, Jean, 4,025,328.
Roepke, Wallace W.; Strebig, Kelly C.; and Johnson, Bradley V., to United States of America, Interior. Method of operating a constant depth linear cutting head on a retrofitted continuous mining machine. 4,025,116, Cl. 299-17.000.
Rogers, Walter Clark, Jr., to Royal Development Company, Inc. Linkage mechanism for handle operated recliner chair. 4,025,113, Cl. 297-434.000.
Rohm and Haas Company: *See*—
Brock, Herbert B., 4,025,467.
Powell, John A.; and Williams, Alan, 4,025,581.
Rohr, Wolfgang: *See*—
Fischer, Adolf; Hansen, Hanspeter; and Rohr, Wolfgang, 4,025,544.
Rohrer, Daniel F., to Eide, Ralph M. Equipment loader and unloader for vehicles. 4,024,971, Cl. 214-450.000.
Rokach, Joshua: *See*—
Rooney, Clarence S.; Rokach, Joshua; and Cragoe, Edward J., Jr., 4,025,625.
Rolston, John H.; Stevens, William H.; Denhartog, James; and Butler, John P., to Atomic Energy of Canada Limited. Process for the exchange of hydrogen isotopes between streams of gaseous hydrogen and liquid water. 4,025,560, Cl. 423-580.000.
Romano, Ronald R. Cumulative calorimeter. 4,024,763, Cl. 73-339.00R.
Romans, Julian R., to Sperry Rand Corporation. AC solenoid with split housing. 4,025,887, Cl. 335-278.000.
Ronald, Richard E., to Clark Equipment Company. Blade attachment with built-in air vent. 4,024,922, Cl. 172-801.000.
Rooney, Clarence S.; Rokach, Joshua; and Cragoe, Edward J., Jr., to Merck & Co., Inc. Imidazothiazines. 4,025,625, Cl. 424-246.000.
Rose, Leslie C.: *See*—
Hamrick, Joseph T.; and Rose, Leslie C., 4,024,912.
Rosen, Perry: *See*—
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Rosenberg, Melvin; and Brickner, Sheldon, to Rosenberg, Melvin; and Schwartz, Morris. Clasp. 4,024,607, Cl. 24-201.0HE.
Rosenberger, Michael, to Hoffmann-La Roche Inc. Tridehydro-canthaxanthin. 4,025,564, Cl. 260-586.00R.
Ross, Arthur; and Davey, Lawrence Preston. Pneumatic seeder assembly. 4,024,822, Cl. 111-34.000.
Rossi, Anthony J.; and Behringer, Donald F., to General Electric Company. Reference signal circuit. 4,025,762, Cl. 235-150.100.
Rossikhin, Vladimir Petrovich: *See*—
Trakhtenberg, Jury Borisovich; Oleshko, Vasily Grigorievich; Klimentiev, Vladimir Ivanovich; Zapunny, Alexandr Iosifovich; Robakovsky, Yaroslav Nikolaevich; Rossikhin, Vladimir Petrovich; and Maximuk, Boris Yakovelevich, 4,024,744.
Rothrock, Larry R., to Union Carbide Corporation. Method for producing r-plane single crystal alpha alumina in massive form having substantially circular cross-section. 4,025,386, Cl. 156-617.0SP.
Rothschild, Barbara G. Folding wheelchair. 4,025,088, Cl. 280-644.000.
Rottmar, Werner: *See*—
Franz, Hans-Jurgen; and Rottmar, Werner, 4,025,846.
Rousselie, Claude Joseph; and Lacharlotte, Pierre. Automatic sorter for fruits and the like. 4,024,955, Cl. 209-121.000.
Rouzier, Georges, to Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie. Adherence of textile fibers to unsaturated polymers. 4,025,454, Cl. 252-182.000.
Rowe, Neal E.: *See*—
Bharteey, Brij M.; and Rowe, Neal E., 4,025,747.
Rowell, John J.: *See*—
Wright, William Warren; Rowell, John J.; and Canty, Edgar P., 4,025,884.
Rowley, Edward C. Safety clip means for reusable shipping container. 4,024,977, Cl. 217-12.00R.
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Rozmus, John J. Electrical contacts. 4,025,143, Cl. 339-278.00C.
Rubin, Gottfried Adolf: *See*—
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Rubin, Steven Allen, to Universal Products, Inc. Wire brush holder coupled to can. 4,025,206, Cl. 401-123.000.
Rubino, Andrew M., to Armour Pharmaceutical Company. Antiperspirant complexes formed with alkali metal and ammonium zirconyl carbonates. 4,025,615, Cl. 424-46.000.
Ruf, Max; and Steinwart, Johannes, to Audi NSU Auto Union Aktiengesellschaft; and Wankel GmbH. Method of making rotary piston engine cast iron interior seals by quench hardening. 4,025,366, Cl. 148-3.000.
Rule, Norman G., to Eastman Kodak Company. Photoconductive polymer and photoconductive compositions and elements containing same. 4,025,341, Cl. 96-1.600.
Runyon, William L., Jr.: *See*—
Meader, Arthur L., Jr.; and Runyon, William L., Jr., 4,025,683.
Ruprecht, Hans-Dieter: *See*—
Gruber, Hermann; Fehlbier, Alois; and Ruprecht, Hans-Dieter, 4,025,579.
Russell, Wayne B., Jr. Throttle control mechanism for an engine. 4,024,711, Cl. 60-423.000.
Russo, Dominic J., Sr.: *See*—
Van Arsdale, Larry A.; and Russo, Dominic J., Sr., 4,025,147.
Rutkowski, Robert; and Taylor, Andrew M., to Monsanto Company. Underblown parts removal from continuous blow molding machinery. 4,025,261, Cl. 425-139.000.
Ruvinsky, Leonid Gershevich: *See*—
Chelnokov, Gennady Ivanovich; Ruvinsky, Leonid Gershevich; Kovalenko, Igor Leonidovich; Sokolov, Ivan Ivanovich; Belyaev, Nikolai Semenovich; Okhotsky, Vladimir Pavlovich; and Belyshev, Leonid Lavrentievich, 4,024,860.
Ryan, John Robert: *See*—
Knoll, Frank; and Ryan, John Robert, 4,024,828.
Rydborn, Sten-Ake Olaus. Apparatus for detecting the movement of one or more objects. 4,025,797, Cl. 307-116.000.
Sadowski, Edward Peter; and Shah, Piyush Champakal, to International Nickel Company, Inc., The. Nickel-chromium filler metal. 4,025,314, Cl. 428-680.000.
Saeki, Hideo: *See*—
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Saft-Societe des Accumulateurs Fixes et de Traction: *See*—
Godard, Pierre; and Prevot, Claude, 4,025,861.
Sagane, Norio; Morimoto, Toru; and Okagawa, Fumihiko, to Sekisui Kagaku Kogyo Kabushiki Kaisha. Apparatus for continuously manufacturing an elongated reinforced shaped article. 4,025,257, Cl. 425-115.000.
Saint, David, to Graco Metal Products, Inc. Baby walker. 4,025,083, Cl. 280-87.050.
Saito, Takeo; and Seki, Youichi, to Seiko Koki Kabushiki Kaisha. Exposure time control device of electric shutter for camera capable of automatic and manual settings. 4,025,929, Cl. 354-50.000.
Sakai, Takuo: *See*—
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Sakamoto, Takayuki: *See*—
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Sala Magnetics, Inc.: *See*—
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Salisbury, Charles W.: *See*—
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Sampson, Ronald L.: *See*—
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Samsonov, Georgy Nikiforovich: *See*—
Balinov, Igor Mikhailovich; Samsonov, Georgy Nikiforovich; Balykov, Vladimir Mikhailovich; Paramonov, Vadim Ivanovich; and Demyashkin, Nikolai Mikhailovich, 4,025,120.
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Sanada, Noriaki: *See*—
Taguchi, Tetsuya; Yazaki, Mutsunobu; and Sanada, Noriaki, 4,025,931.
Sanbongi, Koji; Funakoshi, Tokushi; Tanaka, Tomoo; and Ueda, Syuzo, to Kawasaki Steel Corporation. Weldable steel excellent in the toughness of the bond in a single layer welding with a large heat-input. 4,025,368, Cl. 148-36.000.
Sandel, Dan. No-tear towel clamp. 4,024,870, Cl. 128-321.000.
Sanders Associates, Inc.: *See*—
Hayner, Paul F., 4,024,769.
Sanderson, Ian S.: *See*—
Gray, Alden J.; Sanderson, Ian S.; and Hardy, John C., 4,025,960.
Sandhack, Lothar; Webers, Werner; Michalczyk, Georg; and Gluzek, Karl-Heinz, to Deutsche Texaco Aktiengesellschaft. Continuous process for producing gamma-butyrolactone by catalytic hydrogenation of maleic anhydride. 4,025,534, Cl. 260-343.600.
Sandoz, Inc.: *See*—
Hardtmann, Goetz E., 4,025,511.
Sandoz Ltd.: *See*—
Fleck, Fritz; and Schmid, Hans-Rudolf, 4,025,507.
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Schaub, Fritz; and Schelling, Hans-Peter, 4,025,641.
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Sankyo Dengyo Co. Ltd.: *See*—
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Sankyo Kogaku Kogyo Kabushiki-Kaisha: *See—*
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Santa Barbara Research Center: *See—*
Shaw, John B.; Blatt, Peter R.; and Gesswein, Francis I., 4,025,793.
Sante Fe International Corporation: *See—*
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Sanyo Electric Co., Ltd.: *See—*
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Sartori, Guido: *See—*
Natta, Giulio; Valvassori, Alberto; Sartori, Guido; and Cameli, Nazzareno, 4,025,497.
Sase, Takashi: *See—*
Nihashi, Yoshiyuki; Horinaka, Ikuho; Senda, Syuichi; Katou, Kazuo; and Sase, Takashi, 4,025,849.
Sasshofer, Franz; Gotschy, Friedrich; Krassig, Johannes; and Wimmer, Adalbert, to Chemigfaser Lenzing Aktiengesellschaft. Method of producing threads or fibers of synthetic materials. 4,025,598, Cl. 264-140.000.
Sato, Fumihiko: *See—*
Shibayama, Kyoichi; Sato, Fumihiko; and Takahama, Takashi, 4,025,415.
Sato, Goro, to Hokuetsu Kogyo Co., Ltd. Rotary compressor of liquid-cooled type provided with means for adjusting amount of liquid and volume of gas. 4,025,244, Cl. 418-87.000.
Sato, Kikuji: *See—*
Kanda, Yozo; Maki, Michiyoshi; Migitaka, Masatoshi; and Sato, Kikuji, 4,025,941.
Sato, Masaharu: *See—*
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Sause, H. William: *See—*
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Savo, Gote: *See—*
Nyman, Gustaf Arthur; and Savo, Gote, 4,025,356.
Sawai, Akira, to Nippon Electric Company, Ltd. In-band signal receiver. 4,025,730, Cl. 179-84.0VF.
Sawamoto, Koshi, to Sawamoto Sangyo Kabushiki Kaisha. Method of making brassiere cup. 4,025,597, Cl. 264-138.000.
Sawamoto Sangyo Kabushiki Kaisha: *See—*
Sawamoto, Koshi, 4,025,597.
Sawyer, Patrick Frank, to Girling Limited. Vehicle brake actuating systems. 4,024,795, Cl. 91-384.000.
Saxe, Robert L.; Thompson, Robert I.; and Forlini, Matthew, to Research Frontiers, Incorporated. Light valve, light valve suspension materials and suspension therefor. 4,025,163, Cl. 350-160.00R.
Saxton, Peter V., to Indianapolis Center for Advanced Research, Inc. Apparatus for cleaning and aerating water within an aquarium tank. 4,025,431, Cl. 210-108.000.
Schaefer, William L., to PPG Industries, Inc. Temperature controlled heater tray. 4,024,647, Cl. 34-12.000.
Schafer, Horst-Dieter; Witzel, Manfred; Loosen, Paul; and Haarkotter, Hermann, to Ringfeder GmbH. Shaft coupled to surrounding hub. 4,025,213, Cl. 403-370.000.
Schampers, Paulus Philippus Maria; Carasso, Marino Giuseppo; and Hoeberechts, Arthur Marie Eugene, to U.S. Philips Corporation. Television camera tube having channeled photosensitive target spaced from signal electrode. 4,025,814, Cl. 313-367.000.
Schaub, Fritz; and Schelling, Hans-Peter, to Sandoz Ltd. Polyether substituted 3,4-methylenedioxybenzenes. 4,025,641, Cl. 424-282.000.
Scheffel, Kurt M., to Grey Lab. Establishment, The. Checking apparatus for documents. 4,025,759, Cl. 235-61.70B.
Scheffer, Terry J.: *See—*
Doriguzzi, Rino; and Scheffer, Terry J., 4,025,164.
Schellenbaum, Max; and Dunnenberger, Max, to Ciba-Geigy AG. Quaternary ammonium-hydroxyaryl compounds. 4,025,556, Cl. 260-567.500.
Schelling, Hans-Peter: *See—*
Schaub, Fritz; and Schelling, Hans-Peter, 4,025,641.
Schenck, Paul F. Automatic slide magazine handler. 4,024,966, Cl. 214-7.000.
Schenker Maschinen AG: *See—*
Frei, Max, 4,025,061.
Schering Aktiengesellschaft: *See—*
Nickolson, Robert C.; Kerb, Ulrich; and Wiechert, Rudolf, 4,025,563.
Scheu, Friedrich; and Weberg, Glenn W., to Hewlett-Packard Company. Spinner chuck for non-circular substrates. 4,024,835, Cl. 118-52.000.
Scheurich, Joseph T.: *See—*
Stackhouse, James H., Jr.; Craze, Edward G., Jr.; Morrison, John A.; and Scheurich, Joseph T., 4,025,324.
Scheutle, Erich: *See—*
Bucher, Erich; and Scheutle, Erich, 4,024,697.
Schexnayder, Lawrence F.; and Peterson, Wayne A., to Caterpillar Tractor Co. Control valve providing two speed operation for a motor. 4,024,798, Cl. 91-436.000.
Schicht, Rudolf: *See—*
Zander, Michael; and Schicht, Rudolf, 4,025,899.
Schillani, Dario: *See—*
Mancini, Giuseppe; Imparato, Luigi; and Schillani, Dario, 4,025,447.
Schiller Industries, Inc.: *See—*
Hayosh, Thomas David; and Carosella, John Henry, 4,025,761.
Schirer, David K., to Gehl Company. Bale handling apparatus. 4,024,970, Cl. 214-147.00G.
Schirmag, Klaus-Peter: *See—*
Muller, Manfred; and Schirmag, Klaus-Peter, 4,024,946.
Schirmer, Henry G., to W. R. Grace & Co. Entrapped liquid treatment of laminated film. 4,025,376, Cl. 156-145.000.
Schirneker, Hans-Ludwig. Cartridge for firearms. 4,024,819, Cl. 102-38.000.
Schlacht, Ernst, to Johann Weiss Maschinenfabrik und Apparatebau GmbH. Feeder mechanism for a labelling machine. 4,025,067, Cl. 271-33.000.
Schlagenhauf, Philip B., to Lan-See, Inc. Camper-pontoon boat construction. 4,024,592, Cl. 9-1.200.
Schlatter, James M.: *See—*
Goldkamp, Arthur H.; Mazur, Robert H.; and Schlatter, James M., 4,025,551.
Schlein, Herbert N.: *See—*
Ciecuch, Ronald F. W.; and Schlein, Herbert N., 4,025,682.
Schleis, Jerome J., to Northwest Engineering Company. Crane with foldable boom. 4,024,957, Cl. 212-144.000.
Schmaedeke, Wilbur. Side view mirror assembly. 4,025,173, Cl. 350-304.000.
Schmid, Hans G. Air atomizer bottle sprayer with screw cap. 4,024,992, Cl. 222-211.000.
Schmid, Hans-Rudolf: *See—*
Fleck, Fritz; and Schmid, Hans-Rudolf, 4,025,507.
Schmidt, Felix Helmut: *See—*
Weyer, Rudi; Aumuller, Walter; Hitzel, Volker; and Schmidt, Felix Helmut, 4,025,519.
Schmidt, Hans Joachim, to Armaturenfabrik Hermann Voss. Hose coupling. 4,025,049, Cl. 251-149.600.
Schmidt, Peter Jurgen; and Kizler, Harald, to Robert Bosch G.m.b.H. Apparatus for the control of air admission to the exhaust system of an internal combustion engine including a safety circuit means. 4,024,707, Cl. 60-276.000.
Schmidt, Peter Jurgen: *See—*
Peter, Bernd; and Schmidt, Peter Jurgen, 4,024,850.
Schneider, Antonius: *See—*
Naegeli, Werner; and Schneider, Antonius, 4,025,302.
Schneider, Herbert Anton, to Bell Telephone Laboratories, Incorporated. Negative conductance network. 4,025,735, Cl. 179-170.00G.
Schneider, Rupert, to Sandoz Ltd. 6-Chloro-2,4-diaminopyrimidines. 4,025,515, Cl. 260-256.40N.
Schnoller, Manfred: *See—*
Martin, Joachim; Haas, Ernst; Reuschel, Konrad; and Schnoller, Manfred, 4,025,365.
Schnur, Rodney C.: *See—*
Kraska, Allen R.; and Schnur, Rodney C., 4,025,555.
Schober, Donald Lincoln, to Union Carbide Corporation. Composition with peroxides and process for avoiding scorching of ethylene polymer composition. 4,025,706, Cl. 526-57.000.
Scholdstrom, Karl Ragnar; Marcus, Holger; Nordstrom, Lennart; and Stahl, Nils, to AGA Aktiebolag. Optical measuring method. 4,025,192, Cl. 356-152.000.
Schollmeier, Charles E.: *See—*
Leiser, Roger S.; Liaw, Gin Chain; and Schollmeier, Charles E., 4,025,357.
Schoppe, Wayne F.: *See—*
Taylor, Thomas N.; Schoppe, Wayne F.; and Mooney, Thomas J., 4,025,187.
Schreyer, Gerd: *See—*
Kleemann, Axel; Kolb, Heinz; Rindfuss, Anne; Schreyer, Gerd; Schworzer, Ludwig-Karl; and Schuster, Gregor, 4,025,540.
Schubert & Salzer Maschinenfabrik Aktiengesellschaft: *See—*
Goldammer, Georg; and Beitzinger, Kurt, 4,024,699.
Schultz, Horst, to AMC International Alfa Metalcraft Corporation AG. Pressure cooker. 4,024,982, Cl. 220-293.000.
Schuster, Donald R., to White-Westinghouse Corporation. Air humidifier. 4,025,587, Cl. 261-30.000.
Schuster, Gregor: *See—*
Kleemann, Axel; Kolb, Heinz; Rindfuss, Anne; Schreyer, Gerd; Schworzer, Ludwig-Karl; and Schuster, Gregor, 4,025,540.
Schuster, John E.: *See—*
Moody, Burton E.; and Schuster, John E., 4,025,318.
Schwartz, Morris: *See—*
Rosenberg, Melvin; and Brickner, Sheldon, 4,024,607.
Schwarz, Gerhard, to Microtherm GmbH, Firma. Non-resettable heat responsive safety switch. 4,025,889, Cl. 337-408.000.
Schwarzinger, Ernst: *See—*
Obendorf, Werner; Lindner, Irmgard; Schwarzinger, Ernst; and Krieger, Josef, 4,025,550.
Schweitzer, Karl Friedrich. Cutting and feeding mechanism for suction inlet. 4,024,655, Cl. 37-58.000.
Schworzer, Ludwig-Karl: *See—*
Kleemann, Axel; Kolb, Heinz; Rindfuss, Anne; Schreyer, Gerd; Schworzer, Ludwig-Karl; and Schuster, Gregor, 4,025,540.
SCM Corporation: *See—*
McGinniss, Vincent Daniel, 4,025,409.
Ramig, Alexander, Jr., 4,025,483.
Scott, Calvin L.; and Leopold, Howard S., to United States of America, Navy. Stab-initiated explosive device containing a single explosive charge. 4,024,818, Cl. 102-27.00R.
Scott, Howard L.: *See—*
McClain, James E.; and Scott, Howard L., 4,025,834.
Scragg, Edgar Peter. Fluid flow control valve. 4,025,051, Cl. 251-335.00A.
Scragg, Robert L.; and Parker, Alfred B. Solar reactor engine. 4,024,715, Cl. 60-641.000.

Secim: *See—*
Quehen, Andre, 4,024,755.

Seesee, Thomas A.: *See—*
Deering, Roland F.; Dhondt, Roland O.; and Seesee, Thomas A., 4,025,416.

Seibu Polymer Kasei Kabushiki Kaisha: *See—*
Mizuochi, Hisayuki, 4,025,674.

Seidel, Harold, to Bell Telephone Laboratories, Incorporated. Capacitance magnification circuit. 4,025,867, Cl. 328-127.000.

Seiko Koki Kabushiki Kaisha: *See—*
Saito, Takeo; and Seki, Youichi, 4,025,929.

Seki, Youichi: *See—*
Saito, Takeo; and Seki, Youichi, 4,025,929.

Sekikawa, Aisuke; and Aragaki, Takahiko, to Nippon Electric Company, Ltd. Dot matrix type serial printer. 4,024,941, Cl. 197-1.00R.

Sekisui Kagaku Kogyo Kabushiki Kaisha: *See—*
Sagane, Norio; Morimoto, Toru; and Okagawa, Fumihiko, 4,025,257.

Semenov, Jury Nikolaevich: *See—*
Naidich, Jury Vladimirovich; Lavrinenko, Irina Alexandrovna; Kondratsky, Vladimir Afanasievich; Semenov, Jury Nikolaevich; Emelyanov, Boris Mikhailovich; and Kogosov, Leonid Pinkhusovich, 4,024,675.

Senda, Syuichi: *See—*
Nihashi, Yoshiyuki; Horinaka, Ikuho; Senda, Syuichi; Katou, Kazuo; and Sase, Takashi, 4,025,849.

Serdex - Societe d'Etudes, de Recherches, de Diffusion et d'Exploitation: *See—*
Perrault, Marcel, 4,025,508.

Setsuie, Takashi; Fujinaga, Yoshikazu; and Mimura, Koji, to Mitsubishi Rayon Co., Ltd. Apparatus for production of composite structure fibers. 4,025,279, Cl. 425-463.000.

Seward, Thomas P., III, to Corning Glass Works. Photographic contrast enhancement system using photochromic glass. 4,025,191, Cl. 355-71.000.

Seybold, Wolfgang: *See—*
Hendrischk, Wolfgang; Ott, Hubert; Seybold, Wolfgang; Heisele, Horst; and Mayr, Karl, 4,024,940.

Shackle, Dale Richard, to Mead Corporation, The. Cross-linked hydroxypropylcellulose microcapsules and process for making. 4,025,455, Cl. 252-316.000.

Shaefer, Archie B.: *See—*
Arnold, John B.; Bowyer, John M.; Hegbar, Howard R.; and Shaefer, Archie B., 4,025,916.

Shaffer, Clifford K.; and Weiss, Joe B., to United States of America, Navy. Repairable shielded cable connector. 4,025,145, Cl. 339-143.00R.

Shaffer, Walter M.; Doyle, James R.; and Virostek, Victor V., to Towmotor Corporation. Heavy lift side loader truck. 4,024,968, Cl. 214-75.00G.

Shah, Piyush Champakal: *See—*
Sadowski, Edward Peter; and Shah, Piyush Champakal, 4,025,314.

Shaner, Donald R.: *See—*
Nordberg, Svein T.; and Shaner, Donald R., 4,025,150.

Shannon, Suel Grant: *See—*
Huber, John Henry; and Shannon, Suel Grant, 4,025,142.

Shapiro, Eugene: *See—*
Parikh, Prakash D.; and Shapiro, Eugene, 4,025,367.

Shariff, Sadiq A.: *See—*
Wilson, John R.; Bharteey, Brij M.; and Shariff, Sadiq A., 4,025,826.

Sharp Kabushiki Kaisha: *See—*
Fujimoto, Isao; Kasubuchi, Takeshi; and Aiba, Masahiko, 4,025,926.
Miyata, Shizuo; and Nakao, Motokazu, 4,025,938.

Sharp, William Thomas: *See—*
Barkan, Philip; and Sharp, William Thomas, 4,025,886.

Sharps Associates: *See—*
Portlock, David Edward, 4,025,521.

Shatto, Harry Howland, to Sante Fe International Corporation. Navigation system for maneuvering a structure about a submerged object. 4,025,895, Cl. 340-3.00R.

Shattuck, John R.: *See—*
Emerson, Ralph Waldo; and Shattuck, John R., 4,025,354.

Shaw, John B.; Blatt, Peter R.; and Geswein, Francis I., to Santa Barbara Research Center. Radiation detector with improved electrical interconnections. 4,025,793, Cl. 250-370.000.

Shaw, Lew. Recording representations of disrupted space patterns. 4,025,898, Cl. 340-146.30E.

Shea, Dennis Owen. Paint filtering apparatus. 4,025,435, Cl. 210-250.000.

Shearer, Herbert N., to Pavement Systems, Inc. Equipment for making asphalt paving compositions. 4,025,057, Cl. 259-154.000.

Shell Oil Company: *See—*
Fisch, Edwin J., 4,025,322.
Kollmeyer, Willy D., 4,025,529.
Kravetz, Louis; and Lutz, Eugene F., 4,025,453.
Payne, George Bernson, 4,025,634.
Verbrugge, Pieter A.; and Brunmayer-Schilt, Willy, 4,025,562.

Shelton, Jack: *See—*
Leasure, William; Garcia, Luis; Reifel, Charles; and Shelton, Jack, 4,024,693.

Shelton Properties, Limited: *See—*
Wilson, Leslie Peter Stuart, 4,025,280.

Sheppard, Chester Stephen: *See—*
MacLeay, Ronald Edward; and Sheppard, Chester Stephen, 4,025,502.

Sheppard, John B. Lowering device. 4,024,927, Cl. 182-5.000.

Shibata, Masahiro, to Kabushiki Kaisha Daikin Seisakusho. Brake shoe. 4,024,934, Cl. 188-250.00G.

Shibata, Takanori; and Omae, Tsutomu, to Agency of Industrial Science & Technology. Control system for battery hybrid system. 4,025,860, Cl. 320-3.000.

Shibata, Tsuneo; Maki, Masao; Suzuki, Masao; and Kawabe, Hidehiko, to Matsushita Electric Industrial Co., Ltd. Methods of purifying gas containing nitrogen oxide, and compositions used therefor. 4,025,603, Cl. 423-239.000.

Shibayama, Kyoichi; Ono, Hiroshi; Jidai, Eiki; and Saeki, Hideo, to Mitsubishi Denki Kabushiki Kaisha. Process for soldering an electrocoated substrate. 4,025,037, Cl. 228-214.000.

Shibayama, Kyoichi; Sato, Fumihiko; and Takahama, Takashi, to Mitsubishi Denki Kabushiki Kaisha. Apparatus for preparing an electrocoated product. 4,025,415, Cl. 204-300.0EC.

Shibuya Kogyo Company, Ltd.: *See—*
Ishioka, Yoshiji; and Kawamura, Jyuro, 4,024,896.

Shigemori, Hideto: *See—*
Hatanaka, Yoshihiro; Shigemori, Hideto; and Ueba, Akio, 4,025,758.

Shimamura, Hironori: *See—*
Hara, Hirohito; and Shimamura, Hironori, 4,025,877.

Shimizu, Yoshihito: *See—*
Hamaguchi, Youshi; Yukami, Noboru; Tomioka, Tatsuyuki; Shimizu, Yoshihito; and Kondo, Hiroyuki, 4,025,890.

Shimosawa, Akemi: *See—*
Matsumoto, Masakazu; Nishide, Katsuhiko; Shimosawa, Akemi; and Kinjo, Kikuo, deceased, 4,025,399.

Shin-Etsu Chemical Company Limited: *See—*
Kodama, Iehiro; Kudo, Yoshiaki; Kobori, Takahide; and Kozima, Tokue, 4,025,485.

Shinnitoku Denki Kabushiki Kaisha: *See—*
Makihara, Masuichi, 4,025,829.

Shionogi & Co., Ltd.: *See—*
Maeda, Ryozo; and Hirose, Katsumi, 4,025,528.
Nagata, Wataru; Okada, Kyo; Itazaki, Hiroshi; and Aoki, Tsutomu, 4,025,553.

Shiozaki, Tadao; and Meguro, Daitetsu, to Bridgestone Tire Company Limited. Apparatus for splicing rubber coated cord fabric sections. 4,025,384, Cl. 156-502.000.

Shipley, George M.: *See—*
Mendiratta, Sudhir K.; Dotson, Ronald L.; and Shipley, George M., 4,025,545.

Shipman, Johnson; and Gilles, Herbert L., to Bethlehem Steel Corporation. Method and apparatus for measuring product surface temperature in a spray cooling chamber. 4,024,764, Cl. 73-340.000.

Shiraishi, Minoru: *See—*
Kobayashi, Kazuo; Ohmori, Shiroh; Hasuda, Tetsuhiko; Shiraishi, Minoru; and Arai, Satoshi, 4,025,689.

Shirley, John W.; and DePhillips, James V., to Wrap-On Company, Inc. Thermostatic electric cable heater. 4,025,755, Cl. 219-549.000.

Shrader, Delworth. Meter power distribution apparatus for mobile homes with a detachable front panel for power outlet fittings. 4,025,825, Cl. 361-374.000.

Sibidi, Juan Ramoneda, to Mecano Quimica S.A. Apparatus for obtaining artificial gravity in liquids. 4,025,234, Cl. 417-28.000.

Siblik, Allen D.: *See—*
Hlinsky, Emil J.; and Siblik, Allen D., 4,024,820.

Sideris, Sotirios, to Quasar Electronics Corporation. Frequency synthesizer tuning system for television receivers. 4,025,953, Cl. 358-191.000.

Siderits, Robert T.; and Liegel, Reinald D., to TCI Power Products, Inc. Forklift truck with selectively connectable mast. 4,024,973, Cl. 214-674.000.

Siebert, Alan R., to B. F. Goodrich Company, The. Elastomeric liquid polymer vulcanizates from epoxy resin, liquid carboxy terminated polymer, dihydric phenol, and an amine. 4,025,578, Cl. 260-837.00R.

Siegel, Leon Sidney, to Combustion Engineering, Inc. Fail-safe circuit. 4,025,798, Cl. 307-118.000.

Siegel, Louis: *See—*
Amato, John; Hirsch, Charles; and Siegel, Louis, 4,025,267.

Siemens Aktiengesellschaft: *See—*
Euler, Karl, 4,025,725.
Martin, Joachim; Haas, Ernst; Reuschel, Konrad; and Schnoller, Manfred, 4,025,365.

Sigma Instruments, Inc.: *See—*
Field, John H., 4,025,810.

Silva, Lou; and Spector, George. Manganese storage battery. 4,025,699, Cl. 429-72.000.

Simpson, Robert E.; and Vattuone, Evor Silvio, to Singer Company, The. Apparatus for convoluting complex functions expressed as fourier series. 4,025,769, Cl. 235-156.000.

Sincius, Joseph Anthony: *See—*
Allen, Charles Anthony; Bailey, Thomas Albert, III; and Sincius, Joseph Anthony, 4,025,344.

Singer Company, The: *See—*
Jacyno, Henry, 4,024,888.
Mishcon, Lester; and Agulnek, Harry, 4,024,733.
Simpson, Robert E.; and Vattuone, Evor Silvio, 4,025,769.

Sippican Corporation, The: *See—*
Washburn, Ralph G., 4,025,847.

Sircar, Shivaji: *See—*
Dalton, Augustine I., Jr.; and Sircar, Shivaji, 4,025,605.

Sironi, Giuseppe: *See—*
Montino, Franco; Colombo, Luigi; and Sironi, Giuseppe, 4,025,611.

Siskin, Michael; and Porcelli, Joseph J., to Exxon Research and Engineering Company. Hydroalkylation of paraffins with olefins utilizing hydrogen fluoride and metal pentafluoride catalyst. 4,025,577, Cl. 260-683.510.

Skala, Stephen E. Forced air range with thermal exchange fluid. 4,024,904, Cl. 165-2.000.

Skyhook Sales Corporation: *See—*
Jacobsen, Arnold Ralph; and Jaffe, I. Pompe, 4,025,019.

Slaats, Hendrick J., to Texas Instruments Incorporated. Rolled stock of powder metallurgically-formed, nonductile material and method of production. 4,025,313, Cl. 428-584.000.

Slade, Paul G.; and Wafer, John A., to Westinghouse Electric Corporation. Modular integral motor controller. 4,025,883, Cl. 335-16.000.

Slepyan, David H.; and Nestor, Jack, to Nestor Engineering Associates, Inc. Mouth gag having three dimensional alveolus retractor adjustability. 4,024,859, Cl. 128-12.000.

Smith, Carol S.: *See—*
Adawi, Marwan K.; Briggs, Allan D.; DeLosh, Robert G.; and Smith, Carol S., 4,024,706.

Smith, David B. Rotary internal combustion engine with oscillating pistons. 4,024,841, Cl. 123-8.450.

Smith, Douglas A., to Burroughs Corporation. Drive system for switched inductive loads particularly for multi-phase stepping motors. 4,025,859, Cl. 318-696.000.

Smith, Frank Patterson, 2nd: *See—*
Ferrara, John M.; and Smith, Frank Patterson, 2nd, 4,025,923.

Smith, Henry: *See—*
Thiene, Carl G., deceased; and Smith, Henry, 4,024,813.

Smith, Jonathan; Larko, Robert C.; and Booth, Eugene E., to Sunbeam Equipment Corporation. Rotary retort furnace. 4,025,297, Cl. 432-112.000.

Smith Kline & French Laboratories Limited: *See—*
Durant, Graham John; and Ganellin, Charon Robin, 4,025,527.

Smith, Leland Bryan, to Beckman Instruments, Inc. Solid state amplifier. 4,025,869, Cl. 328-162.000.

Smith, Oliver W.: *See—*
Borden, George W.; Smith, Oliver W.; and Trecker, David J., 4,025,477.

Smith, Paul D.; and Mannes, Phillip. Dynamic control valve for modifying fluid flow. 4,024,889, Cl. 137-517.000.

Smith, Peter R., to Fairchild Camera and Instrument Corporation. Process for simultaneously fabricating epitaxial resistors, base resistors, and vertical transistor bases. 4,025,364, Cl. 148-1.500.

Smith, Valy Z. Knife sharpener. 4,025,319, Cl. 51-208.000.

Smith, William Lee, to A-T-O Inc. Pad and garment assembly. 4,024,584, Cl. 2-24.000.

Smith, William R.: *See—*
McKay, Richard H.; Smith, William R.; and Deutsch, Herman, 4,025,757.

SmithKline Corporation: *See—*
Berges, David A., 4,025,626.
Gyurik, Robert J.; and Kingsbury, William D., 4,025,638.
Snader, Kenneth M.; and Willis, Chester R., 4,025,614.
Snader, Kenneth M.; and Willis, Chester R., 4,025,642.

Smrt, Thomas J. Dispensing apparatus for aerosol spray cans. 4,024,990, Cl. 222-180.000.

Snader, Kenneth M.; and Willis, Chester R., to SmithKline Corporation. Substituted 2H-pyran-2,6 (3H)-dione derivatives useful in treatment of allergic reactions. 4,025,614, Cl. 424-45.000.

Snader, Kenneth M.; and Willis, Chester R., to SmithKline Corporation. Substituted 2H-pyran-2, 6(3H)-dione derivatives. 4,025,642, Cl. 424-283.000.

Snam Progetti S.p.A.: *See—*
Mancini, Giuseppe; Imparato, Luigi; and Schillani, Dario, 4,025,447.

Snyder, George. Multiple stratum mask. 4,024,837, Cl. 118-505.000.

Snyder, Wayne M., to Raymond Lee Organization, Inc., The, a part interest. Roof snow scoop device. 4,024,654, Cl. 37-53.000.

Societa' Farmaceutici Italia S.p.A.: *See—*
Arcamone, Federico; Bargiotti, Alberto; Cassinelli, Giuseppe; and diMarco, Aurelio, 4,025,623.

Societa' Italiana Resine S.I.R. S.p.A.: *See—*
Ferlazzo, Natale; Buzzi, Gian Fausto; Ghirga, Marcello; and Calcagno, Benedetto, 4,025,549.

Societe Anonyme dite: Antar Petroles de l'Atlantique: *See—*
Ouvrard, Paul, 4,024,753.

Societe Anonyme dite: L'Oreal: *See—*
Lang, Gerard, 4,025,301.

S.A. PRB: *See—*
Jourquin, Lucien; and Du Prez, Eddie, 4,025,466.

Societe Civile de Recherches et d'Etudes Nouvelles (S.C.R.E.E.N.): *See—*
Orzalesi, Henri Ange, 4,025,552.

Societe Generale de Constructions Electriques et Mecaniques-(ALSTHOM): *See—*
Lhommelet, Robert; and Raynal, Jean-Paul, 4,025,845.

Societe Lignes Telegraphiques et Telephoniques: *See—*
Joly, Jean; and Ranger, Jean Bernard, 4,025,404.

Societe Nationale Elf Aquitaine (Production): *See—*
Pornin, Rene; Blanc, Jean-Henri; and Voirin, Robert, 4,025,703.

Societe Suisse pour l'Industrie Horlogere Management Services S.A.: *See—*
Weber, Claude, 4,025,806.

Societe Technique de Pulverisation: *See—*
Boris, Michel, 4,025,046.

Sode, Laurence A. Antenna apparatus. 4,025,856, Cl. 325-379.000.

Sokolov, Ivan Ivanovich: *See—*
Chelnokov, Gennady Ivanovich; Ruvinsky, Leonid Gershevich; Kovalenko, Igor Leonidovich; Sokolov, Ivan Ivanovich; Belyaev, Nikolai Semenovich; Okhotsky, Vladimir Pavlovich; and Belyshev, Leonid Lavrentievich, 4,024,860.

Sokolow, Nickolas N.: *See—*
Daane, Robert A.; Beachler, Edward D.; Vonderau, Raymond C.; and Sokolow, Nickolas N., 4,025,294.

Sola Basic Industries, Inc.: *See—*
Thibeault, Ronald N., 4,025,144.

Solar, Carl M.: *See—*
Haselwood, Donald E.; and Solar, Carl M., 4,025,851.

Sollish, Bruce D.; and Frei, Ephraim H., to Yeda Research & Development Co. Ltd. Electro optical imaging device. 4,025,165, Cl. 350-161.00S.

Solvay & Cie: *See—*
Raganato, Carlo; and Voituron, Georges, 4,025,593.

Sommers, William S.: *See—*
Ng, Joseph Sau-Ho; and Sommers, William S., 4,025,766.

Sone, Hitoshi: *See—*
Orima, Isamu; Sone, Hitoshi; and Sone, Kiyoshi, 4,025,958.

Sone, Kiyoshi: *See—*
Orima, Isamu; Sone, Hitoshi; and Sone, Kiyoshi, 4,025,958.

Sony Corporation: *See—*
Kurokawa, Hiromichi; Okada, Haruhiko; and Yamazaki, Masaru, 4,025,815.

Soot, Olaf. Retractable motor mount. 4,025,010, Cl. 248-4.000.

Sorger, Eberhard: *See—*
Engel, Hans; and Sorger, Eberhard, 4,024,891.

Sorsen, Spencer L., to National Steel Corporation. Method and apparatus for aligning strip end portions in a continuous strip operation. 4,025,024, Cl. 226-3.000.

Southampton Manufacturing Company, Inc.: *See—*
Camp, Stafford V., III, 4,025,272.

Spadaro, James J.: *See—*
Pominski, Joseph; and Spadaro, James J., 4,025,658.

Spangenberg, Stanley F.: *See—*
Pezzoli, Paul A.; and Spangenberg, Stanley F., 4,025,449.

Spanur, Frank George: *See—*
Tucholski, Gary Ronald; and Spanur, Frank George, 4,025,696.

Spath, Wolfgang: *See—*
Linde, Joachim; and Spath, Wolfgang, 4,025,266.

Spector, George: *See—*
Abate, Rudolph, Sr.; and Spector, George, 4,024,729.
Silva, Lou; and Spector, George, 4,025,699.

SPEM Societa Prodotti Elettronici Meccanici S.r.l.: *See—*
Francolini, Ermanno, 4,025,027.

Sperling, Benjamin. Transparent ruler having longitudinally positioned colored area for isolating rows of symbols for rapid scanning. 4,024,831, Cl. 116-119.000.

Sperry Rand Corporation: *See—*
Matthews, Hugh B., 4,025,240.
Romans, Julian R., 4,025,887.

Spieth, Rudolf. Clamping device. 4,025,214, Cl. 403-370.000.

Spindler, Siegfried Wolfram; and Kohler, Manfred Rudi, to Ries GmbH Bekleidungsverschlussfabrik. Method for producing closing members for supporting hooks or eyes. 4,025,374, Cl. 156-73.100.

Spinner, Georg. Longitudinally sealed insulating support arrangement for HF-coaxial connectors. 4,025,149, Cl. 339-177.00R.

Spiteri, Joseph. Passive, solid state wide range voltage checker. 4,025,850, Cl. 324-133.000.

Sprague Electric Company: *See—*
England, Walter F., 4,024,625.
Pellerin, William F.; and Lovely, Stephen C., 4,025,827.

Spray Tech Corporation: *See—*
Kubiak, John William, 4,025,045.

Spurr, Eugene V.; and Kedzior, Edward S., to Allegheny Ludlum Industries, Inc. Apparatus for making butt-welded tubes. 4,025,749, Cl. 219-84.000.

Staar, Marcel Jules Helene. Apparatus for blocking a cassette in a storage magazine. 4,024,954, Cl. 206-387.000.

Stables, Wilbur Leon: *See—*
Weiss, William Robert; Cooksey, James Judson; and Stables, Wilbur Leon, 4,024,698.

Stackhouse, James H., Jr.; Craze, Edward G., Jr.; Morrison, John A.; and Scheurich, Joseph T., to Texaco Inc. Hydrocarbon vapor control unit and system. 4,025,324, Cl. 55-179.000.

Stahl, Nils: *See—*
Scholdstrom, Karl Ragnar; Marcus, Holger; Nordstrom, Lennart; and Stahl, Nils, 4,025,192.

Stahle, Helmut; Koppe, Herbert; Kummer, Werner; Stockhaus, Klaus; Hoefke, Wolfgang; and Kuhn, Franz Josef, to Boehringer Ingelheim GmbH. Propargyl-substituted 2-phenylamino-2-imidazolines and salts thereof. 4,025,607, Cl. 424-273.000.

Stahle, Helmut: *See—*
Koppe, Herbert; Stahle, Helmut; Kummer, Werner; and Traunecker, Werner, 4,025,646.

Stal-Laval Turbin AB: *See—*
Hedstrom, Martin; Olesen, Carsten; and Vind, Tyge, 4,025,222.

Stam, John G.: *See*—
Hamanaka, Ernest S.; and Stam, John G., 4,025,504.
Hamanaka, Ernest S.; and Stam, John G., 4,025,506.

Standard Oil Company (Indiana): *See*—
Fields, Ellis K.; and Steitz, Alfred, Jr., deceased, 4,025,569.
Nelson, James P.; and Steitz, Alfred, Jr., deceased, 4,025,491.

Stanley, Peter W. Shipping and growing apparatus for seeds. 4,024,670, Cl. 47-73.000.

Starbard, Raymond E. Multiple air motor drive unit. 4,025,224, Cl. 415-60.000.

Starrett, Rupert M., to Risdon Manufacturing Company, The. Safety closure assembly for an aerosol container. 4,024,988, Cl. 222-153.000.

Statni vyzkumny ustav sklarsky: *See*—
Suesser, Vaclav; Vach, Josef; Ladr, Ivan; and Auerbeck, Jiri, 4,025,713.

Stauffer, James M.: *See*—
Ball, Harry; and Stauffer, James M., 4,025,437.

Stauffer, Larry Ronald, to AMP Incorporated. Package mounting of electronic chips, such as light emitting diodes. 4,024,627, Cl. 29-583.000.

Steelman, Douglas J.: *See*—
Hunt, William E., Jr.; Connin, John L.; and Steelman, Douglas J., 4,025,186.

Stein, Robert George; Couch, Terry Lee; and Crovetti, Aldo Joseph, to Abbott Laboratories. α-Trichloromethyl thenyl anilines as biodigradable insecticides and molluscides. 4,025,531, Cl. 260-332.500.

Stein, Robert George: *See*—
Crovetti, Aldo Joseph; Kenney, Donald Sykes; Lynch, Don Murl; and Stein, Robert George, 4,025,530.

Steinberg, Jack: *See*—
Girdler, George W., 4,024,585.

Steinbrink, Charles F., Jr.: *See*—
Blecher, Jacob B.; Tabor, Gene W.; Steinbrink, Charles F., Jr.; and Wand, Bruce H., 4,024,857.

Steiner, Dennis D. Marking apparatus for stenographic typewriter or the like. 4,024,943, Cl. 197-180.000.

Steiner, Edwin C.; Newton, Robert A.; and Boer, F. Peter, to Dow Chemical Company, The. Cyclic tetra-oxyethylene complexes with ionic compounds. 4,025,523, Cl. 260-297.00R.

Steinmetz, Eberhard; and Kuhn, Jurgen, to Fried. Krupp Huttenwerke AG. Device for the continuous production of steel. 4,025,059, Cl. 266-215.000.

Steinwart, Johannes: *See*—
Ruf, Max; and Steinwart, Johannes, 4,025,366.

Steitz, Alfred, Jr., deceased: *See*—
Fields, Ellis K.; and Steitz, Alfred, Jr., deceased, 4,025,569.
Nelson, James P.; and Steitz, Alfred, Jr., deceased, 4,025,491.

Steitz, Margaret Marie, executrix: *See*—
Fields, Ellis K.; and Steitz, Alfred, Jr., deceased, 4,025,569.
Nelson, James P.; and Steitz, Alfred, Jr., deceased, 4,025,491.

Stenzenberger, Volkmar: *See*—
Wagensonner, Eduard; and Stenzenberger, Volkmar, 4,025,935.

Stephens, William T., to Gresen Manufacturing Company. Orbital device. 4,025,243, Cl. 418-61.00B.

Stephenson, Martin, to Ethicon, Inc. Antimicrobial sutures. 4,024,871, Cl. 128-335.500.

Stern, James F.: *See*—
Guy, Michael G.; and Powers, Richard G., 4,025,613.

Stern, Robert M.: *See*—
Guy, Michael G.; and Powers, Richard G., 4,025,613.

Sternberg, Stanley R.: *See*—
Lennington, John W.; and Sternberg, Stanley R., 4,025,791.

Stevens, William H.: *See*—
Rolston, John H.; Stevens, William H.; Denhartog, James; and Butler, John P., 4,025,560.

Stewart, Harold: *See*—
Keizer, Alan S.; Strube, Hans; and Stewart, Harold, 4,025,750.

Stewart, Mary L. W. Lock nut and bolt construction. 4,024,899, Cl. 151-14.00R.

Stewart, William W., to Western Electric Company, Inc. Sputtering apparatus and methods using a magnetic field. 4,025,410, Cl. 204-192.00R.

Stickle, Warren Edward, Jr. Screw actuated scissor jack with a self adjusting bearing surface. 4,025,053, Cl. 254-122.000.

Stieh, Bernhard: *See*—
Behrendt, Wilhelm A.; and Stieh, Bernhard, 4,025,633.

Stiles, Charles E., to Actionite Company, Inc. Apparatus for decasing food links. 4,024,602, Cl. 17-1.00F.

Stinson, Robert A., to Caterpillar Tractor Co. Variable ratio planetary assembly. 4,024,776, Cl. 74-689.000.

Stockhaus, Klaus: *See*—
Stahle, Helmut; Koppe, Herbert; Kummer, Werner; Stockhaus, Klaus; Hoefke, Wolfgang; and Kuhn, Franz Josef, 4,025,607.

Stolka, Milan; and Turner, Sam R., to Xerox Corporation. Intrachain charge transfer complexes. 4,025,710, Cl. 526-284.000.

Stolpe, Jens Torvald, to Hiab-Foco Aktiebolag. Industrial robot comprising a control system. 4,024,961, Cl. 214-1.0BD.

Stone, Dale Eugene, to Bell Telephone Laboratories, Incorporated. Telephone ringing control circuits. 4,025,729, Cl. 179-84.00R.

Stonner, Hans Martin; and Wiesner, Paul, to Metallgesellschaft Aktiengesellschaft. Process for removing monohydric and polyhydric phenols from waste water. 4,025,423, Cl. 210-21.000.

Storey Brothers & Company Limited: *See*—
Fenton, Sidney Desmond, 4,025,372.

Storey, James Benton, to Allied Chemical Corporation. Zinc-containing foliar spray. 4,025,330, Cl. 71-30.000.

Stout, Robert K. Concrete form for casting-in-place a concrete structure. 4,025,021, Cl. 249-61.000.

Stover, William Harold, to Exxon Research and Engineering Company. Mannich base reaction products useful as liquid hydrocarbon additives. 4,025,316, Cl. 44-58.000.

Stratman, Urban Frederick, to United States of America, Army. Gun muzzle flash suppressor. 4,024,791, Cl. 89-14.00B.

Strebig, Kelly C.: *See*—
Roepke, Wallace W.; Strebig, Kelly C.; and Johnson, Bradley V., 4,025,116.

Streifert, Keith L., to Carrier Corporation. Flexible damped bearing assembly. 4,025,130, Cl. 308-9.000.

Strolenberg, Willem Josef George. Apparatus for use in raising or lowering a load in a condition of relative motion. 4,025,055, Cl. 254-172.000.

Strube, Hans: *See*—
Keizer, Alan S.; Strube, Hans; and Stewart, Harold, 4,025,750.

Stryker, Sylvia A. Stick-a-brow. 4,024,879, Cl. 132-88.500.

Stucker, Robert G., to Wolf Machine Company, The. Simplified safety guard for a cloth cutting machine. 4,024,633, Cl. 30-273.000.

Studer, Arnold David. Process and apparatus for heartworm microfilariae detection. 4,025,306, Cl. 23-230.00B.

Sturgis, Clifford M. Power saw apparatus and miter attachment therefor. 4,024,783, Cl. 83-468.000.

Su, Chiang Shui. Leakage warning device for pneumatic tire. 4,024,829, Cl. 116-34.00R.

Sucre, Raul Betancourt: *See*—
Famiglietti, Michele; and Sucre, Raul Betancourt, 4,025,146.

Sudol, Jean Josephine, to Union Carbide Corporation. Superparamagnetic wax compositions useful in magnetic levitation separations. 4,025,448, Cl. 252-60.000.

Sue, Takaji, to Ricoh Co., Ltd. Sheet feed device for a facsimile system. 4,025,066, Cl. 271-9.000.

Suesser, Vaclav; Vach, Josef; Ladr, Ivan; and Auerbeck, Jiri, to Statni vyzkumny ustav sklarsky. Electric glass-melting furnaces. 4,025,713, Cl. 13-6.000.

Suga, Shigeru. Device for regulating a xenon lamp with optical and temperature compensation. 4,025,440, Cl. 250-205.000.

Suggitt, Robert M.; and Gates, Walter C., Jr., to Texaco Inc. Process for producing secondary alkyl primary amines from n-paraffin. 4,025,561, Cl. 260-583.00K.

Sugimoto, Yutaka, to Kabushiki Kaisha Komatsu Seisakusho. Power transmission in double-drum winch. 4,024,935, Cl. 192-4.00R.

Sugiyama, Shunichi: *See*—
Yamada, Takeo; Kunioka, Kazuo; Sugiyama, Shunichi; and Teramoto, Toyokazu, 4,024,903.

Sugiyama, Takahiro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Wide angle photographic lens. 4,025,168, Cl. 350-196.000.

Suhara, Manabu: *See*—
Oda, Yoshio; Uchida, Keiichi; Suhara, Manabu; and Morimoto, Takeshi, 4,025,565.

Sullair Corporation: *See*—
Hofmann, Rudolf, Jr., 4,024,909.

Sullivan, Lawrence J.: *See*—
Bailey, A. Preston; and Sullivan, Lawrence J., 4,025,292.

Sumitomo Chemical Company, Limited: *See*—
Kirino, Osamu; Ooishi, Tadashi; Kameda, Nobuyuki; Kato, Toshiro; Ozaki, Toshiaki; and Fujinami, Akira, 4,025,651.

Sumiyama, Hiroshi: *See*—
Urakawa, Masaharu; and Sumiyama, Hiroshi, 4,025,390.

Summerlin, Jerry J.: *See*—
Sutton, John C., III; and Summerlin, Jerry J., 4,025,002.

Sumner, Barbara E., to United States of America, Army. Method for making ultra high resolution phosphor screens. 4,025,662, Cl. 427-157.000.

Sunamori, Takashi; and Obana, Sachio, to Mitsubishi Rayon Co., Ltd. Rectifier and rectifying method. 4,025,828, Cl. 361-436.000.

Sunbeam Equipment Corporation: *See*—
Smith, Jonathan; Larko, Robert C.; and Booth, Eugene E., 4,025,297.

Sundberg, Erik G., to Aktiebolaget Tudor. Lead storage battery electrode and method. 4,025,701, Cl. 429-140.000.

Supfina Maschinenfabrik Hentzen KG: *See*—
Wieck, Karl, 4,024,672.

Surftran Company: *See*—
Johnstone, Richard T.; Montag, Alfred C.; Franklin, Charles H.; and Vinton, Clarence S., 4,025,062.

Sutch, Brian Leo Chudleigh, to Airfix Industries Limited. Apparatus for making lids or containers. 4,025,255, Cl. 425-114.000.

Sutton, John C., III; and Summerlin, Jerry J., to PPG Industries, Inc. Spiral for traversing strand material. 4,025,002, Cl. 242-18.00G.

Suwa, Masateru; and Baba, Noboru, to Hitachi, Ltd. Aluminum bronze having a good wear resistance. 4,025,336, Cl. 75-162.000.

Suzuki, Fumio; Tanaka, Mitsuo; and Mera, Yoshiaki, to Nissan Chemical Industries, Ltd. Process for producing thiazoles. 4,025,526, Cl. 260-302.00R.

Suzuki, Gyoichi; Ando, Ryo; Yoshikoshi, Hideyuki; Nagaoka, Seishiro; and Yamaoka, Yogiro, to Nippon Kokan Kabushiki Kaisha. Method and apparatus for denitrifying coke. 4,025,610, Cl. 423-461.000.

Suzuki, Masao: *See*—
Shibata, Tsuneo; Maki, Masao; Suzuki, Masao; and Kawabe, Hidehiko, 4,025,603.

Suzuki, Yoshinobu, to Toyoda Koki Kabushiki Kaisha. Guard device

for a grinding wheel in a grinding machine. 4,024,674, Cl. 51-268.000.
Svenska Rotor Maskiner Aktiebolag: *See—*
Frauenfeld, Martin, 4,025,362.
Svoboda, Josef: *See—*
Krob, Erwin; Weigl, Erwin; and Svoboda, Josef, 4,025,087.
Swiss Aluminium Ltd.: *See—*
Vollenweider, Karl, 4,025,209.
Sylvestre, Michel Alfred: *See—*
Perlman, David; Sylvestre, Michel Alfred; and Sakai, Takuo, 4,025,619.
Syva Company: *See—*
Leute, Richard K., 4,025,501.
Szvoboda, Janos: *See—*
Bar, Vilmos; Mercz, Jeno; Szvoboda, Janos; Pollak, Zsuszanna B.; and Matyas, Jakab, 4,025,631.
Tabata, Norikazu; Yagi, Shigenori; and Ueno, Takanori, to Mitsubishi Denki Kabushiki Kaisha. Ozone generating apparatus. 4,025,441, Cl. 250-540.000.
Tabler, Donald C.; and Johnson, Marvin M., to Phillips Petroleum Company. Hydrocarbon separations. 4,025,574, Cl. 260-677.00A.
Tabor, Gene W.: *See—*
Blecher, Jacob B.; Tabor, Gene W.; Steinbrink, Charles F., Jr.; and Wand, Bruce H., 4,024,857.
Tack, Alfred. Multi pass machining with control of feed increments. 4,025,764, Cl. 235-151.110.
Tafur, Susan S.: *See—*
Neuss, Norbert; and Tafur, Susan S., 4,025,522.
Taguchi, Tetsuya; Yazaki, Mutsunobu; and Sanada, Noriaki, to Canon Kabushiki Kaisha. Exposure data printing device for a camera. 4,025,931, Cl. 354-105.000.
Taillandier, Georges Marcel; Benoit-Guyod, Jean-Louis Alain; Boucherle, Andre Louis; Eymard, Pierre Luc; Broll, Madeleine; and Ferrandes, Bernard, to Labaz. Acetic acid derivatives having pharmacological activity and compositions containing the same. 4,025,649, Cl. 424-318.000.
Takada, Hiroshi; and Hoashi, Kenzo, to Kabushiki Kaisha Komatsu Seisakusho. Method and apparatus for laying pipes in the ground. 4,024,721, Cl. 61-72.700.
Takada, Mamoru: *See—*
Arima, Sumitaro; Oda, Minoru; Miyashita, Kyoichi; and Takada, Mamoru, 4,025,788.
Takagi, Katsuhide; and Fukasawa, Toshiro, to Sankyo Kogaku Kogyo Kabushiki-Kaisha. Cinecamera capable of synchronous recording. 4,025,174, Cl. 352-72.000.
Takahama, Takashi: *See—*
Shibayama, Kyoichi; Sato, Fumihiko; and Takahama, Takashi, 4,025,415.
Takahashi, Hiroshi: *See—*
Ogura, Haruo; and Takahashi, Hiroshi, 4,025,622.
Takahashi, Mitsuru, to Nippon Paint Co., Ltd. Novel resin and coating composition containing same. 4,025,471, Cl. 260-16.000.
Takaishi, Naotake: *See—*
Fujikura, Yoshiaki; Inamoto, Yoshiaki; Ikeda, Hiroshi; and Takaishi, Naotake, 4,025,568.
Takashima, Masaru, to Aikoh Co., Ltd. Moulding for the heat retention of feeder head in casting molten metals. 4,025,047, Cl. 249-204.000.
Takayama, Hirohide; and Yoshimura, Ippei, to Kawaken Fine Chemicals Co., Ltd. Allantoin compound with a metal salt of 2-pyrrolidone-5-carboxylic acid. 4,025,525, Cl. 260-299.000.
Takemoto, Takashi, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Multi cylinder internal combustion engine. 4,024,708, Cl. 60-278.000.
Takenaka, Jyoichi: *See—*
Moriguchi, Sanseki; Abe, Hiroshi; Nishida, Taisuke; Takenaka, Jyoichi; Miyazawa, Makoto; and Iwabuchi, Sadayoshi, 4,025,604.
Takeo, Hiroshi, to Sanyo Electric Co., Ltd. UHF tuner having frequency setting fine toned by varying characteristic impedance of resonant line. 4,025,882, Cl. 334-45.000.
Takeuchi, Hiroo, to Nissbin Kogyo Kabushiki Kaisha. Fluid pressure control device with a fluid failure alarm for a vehicle brake system. 4,024,712, Cl. 60-535.000.
Takimoto, Masaaki; and Honjo, Satoru, to Fuji Photo Film Co., Ltd. Process for toning electrophotographic photosensitive material. 4,025,340, Cl. 96-1.600.
Takita, Hitoshi: *See—*
Enomoto, Satoru; Takita, Hitoshi; Wada, Hisayuki; Mukaida, Yutaka; and Yanaka, Mikiro, 4,025,475.
Tamulis, John Carl: *See—*
Jensen, Donald Frederick; Lee, Ho Chong; and Tamulis, John Carl, 4,025,925.
Tanaka, Akira; and Kuszynski, Gregory G., to American Safety Equipment Corporation. Child safety seat with improved abdominal pad adjustment and buckle securing means. 4,025,111, Cl. 297-390.000.
Tanaka, Mitsuo: *See—*
Suzuki, Fumio; Tanaka, Mitsuo; and Mera, Yoshiaki, 4,025,526.
Tanaka, Tomoo: *See—*
Sanbongi, Koji; Funakoshi, Tokushi; Tanaka, Tomoo; and Ueda, Syuzo, 4,025,368.
Tanaka, Toshiharu; Tsuda, Naoteru; and Arase, Kazuhide, to Matsushita Electric Industrial Co., Ltd. Electromechanical reed filter. 4,025,879, Cl. 333-71.000.
Taneda, Motoharu: *See—*
Kiuchi, Tadashi; Hiraishi, Kiyoto; and Taneda, Motoharu, 4,024,978.
Taniguchi, Naonori; and Imanishi, Shozo, to Aida Engineering Ltd. Three-dimensional work feed device in a transfer press. 4,024,749, Cl. 72-421.000.
Tanikawa, Yukio. Method of producing a baseball bat. 4,025,377, Cl. 156-242.000.
Tanoshima, Katsuhide: *See—*
Watanabe, Akinori; Tanoshima, Katsuhide; and Noguchi, Matsusaburo, 4,024,811.
Tappan Company, The: *See—*
Rickard, Jimmy R., 4,025,804.
Taugner, Roland; and Eschwey, Juergen, to C. Reichert Optische Werke. Anti-roll device for ultramicrotomes. 4,024,779, Cl. 83-165.000.
Tawil, David S.; Clubley, Michael H.; and Farnworth, Frank, to Magnesium Elektron Limited. Ion exchange material. 4,025,608, Cl. 423-305.000.
Taylor, Andrew M.: *See—*
Rutkowski, Robert; and Taylor, Andrew M., 4,025,261.
Taylor, Don A. Articles molding apparatus. 4,025,268, Cl. 425-246.000.
Taylor, Lynn J., to Owens-Illinois, Inc. Modified styrenepolymers. 4,025,580, Cl. 260-874.000.
Taylor, Thomas N.; Schoppe, Wayne F.; and Mooney, Thomas J., to Xerox Corporation. Buckle control system. 4,025,187, Cl. 355-14.000.
TCI Power Products, Inc.: *See—*
Siderits, Robert T.; and Liegel, Reinald D., 4,024,973.
Technical Fabricators, Inc.: *See—*
Ball, Harry; and Stauffer, James M., 4,025,437.
Teich, Wolfgang: *See—*
Markfelder, Gunter; and Teich, Wolfgang, 4,025,129.
Teleglobe Pay-TV System, Inc.: *See—*
Loshin, Albert M., 4,025,948.
Temmler A.G., Firma: *See—*
Behrendt, Wilhelm A.; and Stieh, Bernhard, 4,025,633.
Teppo, Edward A., to United States of America, Navy. Common aperture laser transmitter/receiver. 4,025,194, Cl. 356-5.000.
Teramoto, Toyokazu: *See—*
Yamada, Takeo; Kunioka, Kazuo; Sugiyama, Shunichi; and Teramoto, Toyokazu, 4,024,903.
Teranishi, Akihiko, to Kabushiki Kaisha Teranishi Denki Seisakusho. Massaging vibrator. 4,025,809, Cl. 310-81.000.
Tessenderlo Chemie S.A.: *See—*
Peerts, Fernand; and DeLaunois, Yvon, 4,025,495.
Texaco Inc.: *See—*
Allen, Joseph C., 4,024,915.
Barber, Everett M., 4,025,612.
Hellmuth, Walter W.; and Miller, Edward F., 4,025,445.
Knifton, John F., 4,025,547.
Mead, Theodore C.; McDill, Richard T.; Chesluk, Ralph P.; and Odell, Norman R., 4,025,583.
Stackhouse, James H., Jr.; Craze, Edward G., Jr.; Morrison, John A.; and Scheurich, Joseph T., 4,025,324.
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Texas Instruments Incorporated: *See—*
Adams, Anthony Lionel; and Head, Claude Dedmond, III, 4,024,944.
Adney, Eugene M.; and Thompson, Michael E., 4,025,904.
Doherty, John, Jr.; and Ting, Youn H., 4,025,042.
Gosney, William Milton, 4,025,801.
Slaats, Hendrick J., 4,025,313.
Texeira, Patrick D.: *See—*
Pond, C. Ray; Robinson, Lawrence W.; and Texeira, Patrick D., 4,025,193.
Textron, Inc.: *See—*
Hobbs, Gerald E., 4,025,204.
Monroe, Lawrence S., 4,025,277.
Thalenfeld, David R. Protective tip for panel board hooks and the like. 4,025,018, Cl. 248-303.000.
Thelissen, Guillaume Francois Gustave, to Du Pont de Nemours, E. I., and Company. Electrical connector block. 4,025,141, Cl. 339-99.00R.
Theobald, Michael R., to Caterpillar Tractor Co. Float control electrical circuit for a blade. 4,024,796, Cl. 91-411.00R.
Theysohn, Friedrich; Gienapp, Horst; and Lange, Horst, to Firm Friedrich Theysohn, The. Die mold. 4,025,022, Cl. 249-63.000.
Thibeault, Ronald N., to Sola Basic Industries, Inc. Isolated ground receptacle. 4,025,144, Cl. 339-133.00R.
Thiene, Carl G., deceased (by Thiene, Carol M., executrix); and Smith, Henry, to Reynolds Printasign Company. Card printing machine. 4,024,813, Cl. 101-269.000.
Thiene, Carol M., executrix: *See—*
Thiene, Carl G., deceased; and Smith, Henry, 4,024,813.
Thomas, Alford Mitchell, to Abbott Laboratories. Preparation of histidine-containing peptides. 4,025,499, Cl. 260-112.50R.
Thomas, Marvin C. Apparatus for selectively providing vehicle traction. 4,024,900, Cl. 152-214.000.
Thomerson, Clarence T.: *See—*
Mayfield, Windel O.; Thomerson, Clarence T.; and Waldrop, Tom C., 4,024,723.
Thompson, David F.; and Mouton, William J., Jr. Fluid current turbine with flexible collectors. 4,025,220, Cl. 415-7.000.

Thompson, Homer T. Golf shaft gripping device. 4,025,077, Cl. 273-166.000.
Thompson, Michael E.: *See—*
Adney, Eugene M.; and Thompson, Michael E., 4,025,904.
Thompson, Robert H., to Bendix Corporation, The. Novel technique for spot position measurement. 4,025,197, Cl. 356-111.000.
Thompson, Robert I.: *See—*
Saxe, Robert L.; Thompson, Robert I.; and Forlini, Matthew, 4,025,163.
Thomsen, Gerhard: *See—*
Beyer, Detlef; Linnet, Anton Pedersen; and Thomsen, Gerhard, 4,025,620.
Thomson-Brandt: *See—*
Lehureau, Jean-Claude; and Bricot, Claude, 4,025,784.
Thomson-CSF: *See—*
Beauvais, Thierry; and Carre, Roland, 4,025,775.
Bert, Alain, 4,025,954.
Coussot, Gerard, 4,025,880.
Grallien, Jean-Claude; and Corbel, Ange, 4,025,955.
Rembault, Michel, 4,025,731.
Thomson, James E., to Western Stamping Corporation. Toy cash register. 4,025,756, Cl. 235-1.00E.
Thomson, Ronald E.; and Kast, Philip J., to Madison-Kipp Corporation. Lubricating device and method. 4,024,930, Cl. 184-15.00B.
Tibbals, E. C.: *See—*
Merritt, Robert E.; and Tibbals, E. C., 4,025,026.
Tibbitts, Harry E. Crankcase drain assembly. 4,025,048, Cl. 251-144.000.
Tibbs, Robert C., II. Field breaking and row plowing implement. 4,024,921, Cl. 172-146.000.
Tilby, Sydney Edward. Apparatus for fabricating boards from sugarcane rind fibers. 4,025,278, Cl. 425-404.000.
Timson, Ernest Arthur, to Timsons Limited. Method of and machinery for producing book blocks. 4,025,065, Cl. 270-12.000.
Timsons Limited: *See—*
Timson, Ernest Arthur, 4,025,065.
Ting, Youn H.: *See—*
Doherty, John, Jr.; and Ting, Youn H., 4,025,042.
Tipton, Larry J., to ACF Industries, Incorporated. Metering rod support for carburetor. 4,025,589, Cl. 261-69.00A.
Tohoku Electric Power Company, Inc.: *See—*
Arima, Sumitaro; Oda, Minoru; Miyashita, Kyoichi; and Takada, Mamoru, 4,025,788.
Tokitsu, Tetsuya, to Midland-Ross Corporation. Walking beam furnace for round bar and the like. 4,025,298, Cl. 432-122.000.
Tokura, Yasufumi: *See—*
Nakao, Hisaji; Naruse, Katutoshi; Hasegawa, Kazuhiko; Kawade, Sadao; Tokura, Yasufumi; and Matsuno, Kazuo, 4,025,902.
Tokyo Shibaura Electric Co., Ltd.: *See—*
Horino, Shigeo, 4,025,420.
Toman, Ludek: *See—*
Marek, Miroslav; Toman, Ludek; and Pecka, Jan, 4,025,402.
Marek, Miroslav; Toman, Ludek; and Pecka, Jan, 4,025,403.
Tomb, William H.; and Weetall, Howard H., to Corning Glass Works. Enzyme carriers. 4,025,667, Cl. 427-215.000.
Tomioka, Tatsuyuki: *See—*
Hamaguchi, Youshi; Yukami, Noboru; Tomioka, Tatsuyuki; Shimizu, Yoshihito; and Kondo, Hiroyuki, 4,025,890.
Tomita, Tadayoshi; Kikuchi, Katsutoshi; and Sakamoto, Takayuki, to Toyo Engineering Corporation. Process for manufacturing gaseous mixtures rich in hydrogen. 4,025,457, Cl. 252-373.000.
Tomoe Technical Research Company: *See—*
Manki, Yoshinori; and Uno, Takayoshi, 4,025,050.
Torcomian, Albert, to Environmental Container Corporation. Methods for manufacturing refrigerating systems. 4,024,620, Cl. 29-157.30C.
Touborg, Jorn, to F. L. Smidth & Co. Method of burning pulverous raw material and rotary kiln plant therefor. 4,025,295, Cl. 432-14.000.
Tournayre, Jean Claude; and Vogel, Christian, to Ciba-Geigy Corporation. Halogeno-acetanilides as herbicides. 4,025,554, Cl. 260-562.00A.
Tournut, Claude; and Grimaud, Edouard, to Produits Chimiques Ugine Kuhlmann. Method for the preparation of aqueous dispersions of polytetrafluoroethylene with halogenated hydrocarbon as stabilizing agent. 4,025,481, Cl. 260-29.60F.
Tower, Lee W.: *See—*
Lynch, David D., Jr.; and Tower, Lee W., 4,025,771.
Towmotor Corporation: *See—*
Gedeon, Nelson J., 4,025,080.
Shaffer, Walter M.; Doyle, James R.; and Virostek, Victor V., 4,024,968.
Townsend, John M., to Magna Ply. Method and apparatus for wrapping multiple tapes upon an elongated structure. 4,024,696, Cl. 57-15.000.
Toyo Engineering Corporation: *See—*
Tomita, Tadayoshi; Kikuchi, Katsutoshi; and Sakamoto, Takayuki, 4,025,457.
Toyo Kogyo Co., Ltd.: *See—*
Kurio, Noriyuki; and Ebihara, Tadashi, 4,025,247.
Toyo Soda Manufacturing Co., Ltd.: *See—*
Uemura, Masaru; Kasamatsu, Tadashi; Akiyama, Toshimitsu; Kuroki, Hitoshi; and Kosaka, Yujiro, 4,025,274.
Toyoda Koki Kabushiki Kaisha: *See—*
Nakao, Hisaji; Naruse, Katutoshi; Hasegawa, Kazuhiko; Kawade, Sadao; Tokura, Yasufumi; and Matsuno, Kazuo, 4,025,902.
Suzuki, Yoshinobu, 4,024,674.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Koganemaru, Shunji, 4,024,847.
Nakamura, Norihiko; and Yanagihara, Hiromichi, 4,025,588.
Tracy, J. W. Franklin. Automatic hollow vane shear. 4,024,781, Cl. 83-319.000.
Trakhtenberg, Jury Borisovich; Oleshko, Vasily Grigorievich; Klimentiev, Vladimir Ivanovich; Zapunny, Alexandr Iosifovich; Robakovsky, Yaroslav Nikolaevich; Rossikhin, Vladimir Petrovich; and Maximuk, Boris Yakovelevich. Device for explosive gas forming. 4,024,744, Cl. 72-56.000.
Trapani, Giorgio B.: *See—*
Nagy, Alexander W.; and Trapani, Giorgio B., 4,025,688.
Traunecker, Werner: *See—*
Koppe, Herbert; Stahle, Helmut; Kummer, Werner; and Traunecker, Werner, 4,025,646.
Traunmuller, Hartmut. Method and device for presenting information to deaf persons. 4,025,732, Cl. 179-107.0FD.
Trawick, James C., III, to Grote, Stanley G. Traffic control system. 4,025,922, Cl. 343-6.5LC.
Trecker, David J.: *See—*
Borden, George W.; Smith, Oliver W.; and Trecker, David J., 4,025,477.
Tremco Incorporated: *See—*
Bynoe, Robert J., 4,024,681.
Trenkamp, Robert H., to Addressograph Multigraph Corporation. Security means for transaction terminal system. 4,025,760, Cl. 235-61.70B.
Tresch, Josef: *See—*
Gyimothy, Gabor; and Tresch, Josef, 4,024,984.
Trevoy, Donald J., to Eastman Kodak Company. Organic semiconductors used in photoconductor element. 4,025,342, Cl. 96-1.500.
Trevoy, Donald J., to Eastman Kodak Company. Organic semiconductor compositions. 4,025,463, Cl. 252-500.000.
Trevoy, Donald J., to Eastman Kodak Company. Organic semiconductor element. 4,025,691, Cl. 428-411.000.
Trevoy, Donald J., to Eastman Kodak Company. Organic semiconductors. 4,025,704, Cl. 526-16.000.
Tri/Valley Growers: *See—*
Malvick, Arnold O.; and MacDonald, Wayne W., 4,025,422.
Trip-Lite Ltd.: *See—*
Jordan, Kenneth Albert, 4,024,734.
Tripp, John F., to Dennison Manufacturing Company. Paper holding. 4,024,606, Cl. 24-67.700.
Trubell, Lawrence Paul: *See—*
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TRW Inc.: *See—*
Melnyk, Paul, 4,025,036.
Tsuda, Naoteru: *See—*
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Tsuda, Nobuaki; Inagaki, Kenji; Imamiya, Tamotu; Ohno, Kunio; and Mizoguchi, Yoshiyuki, to Asahi Kasei Kogyo Kabushiki Kaisha. Liquid treatment apparatus. 4,025,436, Cl. 210-321.00A.
Tsukada, Katsushige; Isobe, Asao; Ishimaru, Toshiaki; Hayashi, Nobuyuki; and Abo, Masahiro, to Hitachi Chemical Company, Ltd. Photosensitive resin compositions. 4,025,348, Cl. 96-115.00R.
Tsutsumi, Hisao: *See—*
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Tsuyama Manufacturing Company: *See—*
Tsuyama, Sadaharu, 4,025,158.
Tsuyama, Sadaharu, to Tsuyama Manufacturing Company. Reflector. 4,025,158, Cl. 350-99.000.
Tucholski, Gary Ronald; and Spanur, Frank George, to Union Carbide Corporation. Safety switch for small diameter galvanic cells. 4,025,696, Cl. 426-61.000.
Tula Machine Co., Inc.: *See—*
Matys, Edwin J., 4,025,140.
Tuli, Kuljit S.: *See—*
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Turbodyne Corporation (Steam Turbine Div.): *See—*
Browning, William W.; and Legacy, Donald J., 4,025,229.
Turnbow, Carrol E. Apparatus for dispensing hay from large round bales. 4,025,006, Cl. 242-86.50R.
Turner, Sam R.: *See—*
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Tyler, Hugh J., to Robertshaw Controls Company. Safety valve. 4,025,041, Cl. 236-90.000.
Tyrode, Alain: *See—*
Meister, Rene; and Tyrode, Alain, 4,024,677.
Tyson, George Noblit; and Austin, Robert Roy. Imparter to provide silver to water supplies. 4,024,991, Cl. 222-189.000.
UBE Industries, Ltd.: *See—*
Nagai, Shigeki; Yoshida, Hiroshi; and Inoue, Teruhiko, 4,025,566.
Uchida, Keiichi: *See—*
Oda, Yoshio; Uchida, Keiichi; Suhara, Manabu; and Morimoto, Takeshi, 4,025,565.
Uchida, Motokazu; Hosoda, Taisei; Uzuhashi, Hideo; Kamejima, Kohji; and Kano, Minoru, to Hitachi, Ltd. Control system for an air conditioner. 4,024,725, Cl. 62-176.00E.
Ueba, Akio: *See—*
Hatanaka, Yoshihiro; Shigemori, Hideto; and Ueba, Akio, 4,025,758.
Ueda, Atsumi, to Aisin Seiki Kabushiki Kaisha. Brake booster. 4,024,713, Cl. 60-547.000.
Ueda, Mikio; Kubota, Takeshi; Nishikawa, Yasuo; and Watanabe,

Akira, to Kyushu Taika Renga Kabushiki Kaisha; and Mitsui Shipbuilding and Engineering Co., Ltd. Catalyst for gasification of heavy hydrocarbons in fluidized bed. 4,025,460, Cl. 252-457.000.
Ueda, Syuzo: *See—*
Sanbongi, Koji; Funakoshi, Tokushi; Tanaka, Tomoo; and Ueda, Syuzo, 4,025,368.
Uemura, Masaru; Kasamatsu, Ta-Jashi; Akiyama, Toshimitsu; Kuroki, Hitoshi; and Kosaka, Yujiro, to Toyo Soda Manufacturing Co., Ltd.; and Kasamatsu, Tadashi. Apparatus and process for preparing thermoplastic resin composition. 4,025,274, Cl. 425-376.00B.
Ueno, Takanori: *See—*
Tabata, Norikazu; Yagi, Shigenori; and Ueno, Takanori, 4,025,441.
Uhl, Klaus: *See—*
Heiss, Lorenz; and Uhl, Klaus, 4,025,543.
Uhlig, Albert R., to Owens-Illinois, Inc. Reinforced bottle. 4,024,975, Cl. 215-1.00C.
Umeda, Jun-ichi: *See—*
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Umeda, Keiji: *See—*
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Union Carbide Corporation: *See—*
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Borden, George W.; Smith, Oliver W.; and Trecker, David J., 4,025,477.
Kun, Leslie Charles, 4,024,623.
Litteral, Carl James; and Mullins, David Lee, 4,025,456.
Rifi, Mahmoud Rashad, 4,025,473.
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Sudol, Jean Josephine, 4,025,448.
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Union Oil Company of California: *See—*
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Uniroyal A.G.: *See—*
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United Kingdom Atomic Energy Authority: *See—*
Holman, David James; and James, Howard, 4,025,308.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Industry in Her Britannic Majesty's Government of the: *See—*
Harries, John Edward, 4,025,792.
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Agriculture: *See—*
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Heiderer, Conrad Elmer, 4,024,790.
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Stratman, Urban Frederick, 4,024,791.
Sumner, Barbara E., 4,025,662.
Commerce: *See—*
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Energy Research and Development Administration: *See—*
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Gencsoy, Hasan T., 4,025,317.
Hartley, James N.; and Jansen, George, Jr., 4,024,916.
Marling, John B., 4,025,408.
Federal Communications Commission: *See—*
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Interior: *See—*
Kleysteuber, William K.; and Peterson, William J., Jr., 4,024,949.
Kleysteuber, William K.; and Bean, Ernest H., 4,025,121.
Roepke, Wallace W.; Strebig, Kelly C.; and Johnson, Bradley V., 4,025,116.
National Aeronautics and Space Administration; administrator; with respect to an invention of:
Elachi, Charles. Distributed feedback acoustic surface wave oscillator. 4,025,876, Cl. 331-107.00A.
King, William B. Gregorian all-reflective optical system. 4,025,783, Cl. 250-199.000.
Mikulla, Volker. Method for making a hot wire anemometer and product thereof. 4,025,891, Cl. 338-28.000.
Moore, Robert Clark. Open loop digital frequency multiplier. 4,025,866, Cl. 328-38.000.
Osmundson, John Sigfred. Length controlled stabilized mode-lock Nd:YAG laser. 4,025,875, Cl. 331-94.50S.
National Aeronautics and Space Administration: *See—*
Harris, Robert F., 4,025,327.
Matsumoto, Yutaka; and Lum, Henry, 4,025,950.
Navy: *See—*
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Chilluffo, Ronald L., 4,025,873.
Csanady, Elmer R.; Mosher, Paul R.; and Camp, Albert T., 4,025,370.
Delagrange, Arthur D.; and Pryor, Cabell Nicholas, Jr., 4,025,848.
DuBrul, James M., 4,025,917.
Lamb, Matthew J., 4,024,586.
Lantrip, David B., 4,024,651.
Martin, William E., 4,025,157.
Parker, Francis F., 4,025,843.
Price, Luther A.; and Bryla, Theodore N., 4,025,369.
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U.S. Philips Corporation: *See—*
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Polaert, Remy Henri Francois; Ducarre, Alphonse; Duchenois, Valere Dominique Louis; and Rodiere, Jean, 4,025,328.
Pompei, Jean; Lacroix, Bernard; and Pierrot, Francis, 4,025,892.
Schampers, Paulus Philippus Maria; Carasso, Marino Giuseppo; and Hoeberechts, Arthur Marie Eugene, 4,025,814.
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United States Steel Corporation: *See—*
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United Technologies Corporation: *See—*
Freiberg, Robert J., 4,025,172.
Greenberg, Paul Burton; and Kit, Harry John, 4,025,227.
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United Turbine AB and Co., Kommanditbolag: *See—*
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Universal Products, Inc.: *See—*
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Randolph, Alan; Drach, George; and Miller, John Daniel, 4,025,307.
Uno, Takayoshi: *See—*
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UOP Inc.: *See—*
Antos, George J., 4,025,418.
Cave, David N., 4,025,114.
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Lednicer, Daniel, 4,025,558.
Urakawa, Masaharu; and Sumiyama, Hiroshi, to Hitachi Chemical Company, Ltd. Method for recovering urokinase from a urokinase-containing solution. 4,025,390, Cl. 195-66.00B.
URANIT Uran-Isotopentrennungs-GmbH: *See—*
Jetter, Heinz Leonhard; Gurs, Karl; and Englisch, Wolfgang, 4,025,790.
Ursic, Thomas A.: *See—*
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Utsumi, Tetsuya: *See—*
Kurita, Takaji; Utsumi, Tetsuya; Ikeda, Hiroshi; Komura, Masaru; Miyata, Shin; Kawai, Yoshihisa; and Arai, Kenichi, 4,025,180.
Utterback, Jack Olan; and Fajt, John, to ELT, Incorporated. Apparatus for producing resistors. 4,024,614, Cl. 29-33.00K.
Uzuhashi, Hideo: *See—*
Uchida, Motokazu; Hosoda, Taisei; Uzuhashi, Hideo; Kamejima, Kohji; and Kano, Minoru, 4,024,725.
V. Alfthan, Georg, to Oy Keskuslaboratorio-Centrallaboratorium AB. Method and apparatus for determination of drainability of material in suspension and/or stock form. 4,024,754, Cl. 73-63.000.
Vach, Josef: *See—*
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Vadnay, Attila: *See—*
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Vaginay, Yves, to Rhone-Poulenc-Textile. Process of dyeing articles made from polyesteramines. 4,025,300, Cl. 8-4.000.
Valbusa, Luigi: *See—*
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Valvassori, Alberto: *See—*
Natta, Giulio; Valvassori, Alberto; Sartori, Guido; and Cameli, Nazzareno, 4,025,497.
Van Arsdale, Larry A.; and Russo, Dominic J., Sr., to Dale Electronics, Inc. Connector. 4,025,147, Cl. 339-176.0MP.
Van Dalen, Leonard: *See—*
Disston, Horace C., Jr.; Eichfeld, Timothy; and Van Dalen, Leonard, 4,025,064.
Vanderlans, Gerald G.: *See—*
Horne, Frederick F.; and Vanderlans, Gerald G., 4,025,360.
Van Nes, Johannes Cornelis Adrianus, to U.S. Philips Corporation. Liquid-cooled high pressure metal vapor discharge lamp in particular to be used in a method of manufacturing a color television display tube. 4,025,811, Cl. 313-22.000.
Varian Associates: *See—*
Chupp, Vernon L.; and Duffield, Jack J., 4,025,196.
Moon, Ronald L., 4,025,944.
Vattuone, Evor Silvio: *See—*
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Vaughn, Kennith E.: *See—*
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Vendramini, Alessandra. Device for clamping a body against downward movement. 4,025,414, Cl. 204-297.00R.
Vepa AG: *See—*
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Verbaas, George, to GTE Automatic Electric (Canada) Limited. Balanced tone application system. 4,025,727, Cl. 179-18.0HB.
Verbrugge, Pieter A.; and Brunmayer-Schilt, Willy, to Shell Oil Company. Process for the preparation of macrocyclic ketones. 4,025,562, Cl. 260-586.00P.
Vermillion, Russell L.: *See—*
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Victor Company of Japan, Limited: *See—*
Wada, Kinzo, 4,025,835.
Video Voter Inc.: *See—*
McKay, Richard H.; Smith, William R.; and Deutsch, Herman, 4,025,757.
Vincent, David Conway. Spinal support. 4,024,861, Cl. 128-87.00R.
Vind, Tyge: *See—*
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Vinton, Clarence S.: *See—*
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Virden, Herbert H. Wheeled cart with cable protection attachment. 4,025,099, Cl. 293-58.000.
Virostek, Victor V.: *See—*
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Vitellas, Michael X.: *See—*
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Vogel, Christian: *See—*
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Voirin, Robert: *See—*
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Volkswagenwerk Aktiengesellschaft: *See—*
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Vollenweider, Karl, to Swiss Aluminium Ltd. Device for connecting hollow sections. 4,025,209, Cl. 403-189.000.
Von Alven, Raymond D.: *See—*
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Vonderau, Raymond C.: *See—*
Daane, Robert A.; Beachler, Edward D.; Vonderau, Raymond C.; and Sokolow, Nickolas N., 4,025,294.
von Krusenstierna, Otto, to Aktiebolaget Tudor. Accumulator battery apparatus and method. 4,025,698, Cl. 429-4.000.
Vought Corporation: *See—*
McGregor, Ronald W., 4,024,887.
Vucich, Michael G.; and Vitellas, Michael X., to National Steel Corporation. Method of lubricating a cold reduction mill. 4,024,742, Cl. 72-42.000.
W. F. Meyers Company, Inc.: *See—*
Jansen-Herfeld, Rottger, 4,024,785.
W. L. Gore & Associates, Inc.: *See—*
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W. R. Grace & Co.: *See—*
Crose, James R.; and Hartnett, Charles A., 4,025,660.
Schirmer, Henry G., 4,025,376.
Wada, Hisayuki: *See—*
Enomoto, Satoru; Takita, Hitoshi; Wada, Hisayuki; Mukaida, Yutaka; and Yanaka, Mikiro, 4,025,475.
Wada, Kinzo, to Victor Company of Japan, Limited. Three-phase brushless DC motor. 4,025,835, Cl. 318-254.000.
Wada Seiko Kabushiki Kaisha (Wada Seiko Co., Ltd.): *See—*
Hishida, Tadashi, 4,025,135.
Watanabe, Katsuro, 4,025,132.
Wada, Tasaku; and Nakabo, Satoru, to Kokusai Denshin Denwa Kabushiki Kaisha. Magnetic recording system using magnetic tape. 4,025,957, Cl. 360-48.000.
Wafer, John A.: *See—*
Slade, Paul G.; and Wafer, John A., 4,025,883.
Wagensonner, Eduard; and Stenzenberger, Volkmar, to AGFA-Gevaert, A.G. Camera with means for maintaining a constant DC supply voltage. 4,025,935, Cl. 354-173.000.
Wagner, Kuno: *See—*
Andres, Karlheinz; Wagner, Kuno; Hoffmann, Erwin; and Kapps, Manfred, 4,025,470.
Wahlen, Svante Ludvig, to Berol Kemi AB. Viscose solutions and process for preparing the same. 4,025,353, Cl. 106-165.000.
Wahren, Carl Johan Alexander; and Merdy, Leon Alexandra, to L. M. Ericsson Pty. Ltd. Machine for manufacturing cable forms. 4,024,630, Cl. 29-624.000.
Wakalopulos, George: *See—*
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Wakefield, Fancher B., to Grumman Aerospace Corporation. Self-aligning detachable fitting. 4,025,092, Cl. 285-94.000.
Waldrop, Tom C.: *See—*
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Walker, Laurence G., to Massachusetts Institute of Technology. Solid-state camera employing non-volatile charge storage elements. 4,025,910, Cl. 340-173.0LS.
Wallach, Mark, to Hydro Pulse Corporation. Surgical apparatus for removal of tissue. 4,024,866, Cl. 128-276.000.
Walters, Ian Richard; and Emblem, Harold Garton, to Zirconal Processes Limited. Gellable binders. 4,025,350, Cl. 106-38.350.
Wand, Bruce H.: *See—*
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Wankel GmbH: *See—*
*Ruf, Max; and Steinwart, Johannes, 4,025,366.
Wanlass, Frank Marion, to Integrated Technology Corporation. Binary frequency divider. 4,025,800, Cl. 307-225.00C.
Ward, Carter J.; Huang, Kwang-Ta; and Byrd, George W., to United States of America, Navy. Automatic blade angle controller system. 4,024,823, Cl. 172-4.500.
Ward, Paul S.: *See—*
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Warner, Paul F., to Phillips Petroleum Company. Rodent repellent powders and preparation thereof. 4,025,643, Cl. 424-300.000.
Warren, Henry Ray, to RCA Corporation. Recorder-reproducer system. 4,025,959, Cl. 360-85.000.
Washburn, Ralph G., to Sippican Corporation, The. Measurement system including bridge circuit. 4,025,847, Cl. 324-65.00R.
Washburn, Robert D.: *See—*
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Watanabe, Akinori; Tanoshima, Katsuhide; and Noguchi, Matsusaburo, to Oki Electric Industry Company, Ltd. High speed printing apparatus. 4,024,811, Cl. 101-1.000.
Watanabe, Akira: *See—*
Ueda, Mikio; Kubota, Takeshi; Nishikawa, Yasuo; and Watanabe, Akira, 4,025,460.
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| B 259,274 | 3,928,688 | Dec. 23, 1975 | B 307,677 | 3,915,276 | Oct. 28, 1975 |
| B 260,455 | 3,925,634 | Dec. 9, 1975 | B 308,661 | 3,924,349 | Dec. 9, 1975 |
| B 260,945 | 3,925,250 | Dec. 9, 1975 | B 308,892 | 3,919,624 | Nov. 11, 1975 |
| B 261,378 | 3,913,468 | Oct. 21, 1975 | B 309,207 | 3,914,743 | Oct. 21, 1975 |
| B 261,828 | 3,925,551 | Dec. 9, 1975 | B 309,499 | 3,922,002 | Nov. 25, 1975 |
| B 262,241 | 3,925,528 | Dec. 9, 1975 | B 309,681 | 3,927,374 | Dec. 16, 1975 |
| B 262,287 | 3,921,209 | Nov. 18, 1975 | B 309,755 | 3,919,468 | Nov. 11, 1975 |
| B 262,378 | 3,914,410 | Oct. 21, 1975 | B 309,756 | 3,914,136 | Oct. 21, 1975 |
| B 262,599 | 3,925,323 | Dec. 9, 1975 | B 309,860 | 3,922,485 | Nov. 25, 1975 |
| B 264,257 | 3,928,665 | Dec. 23, 1975 | B 310,149 | 3,924,705 | Dec. 9, 1975 |
| B 264,833 | 3,923,566 | Dec. 2, 1975 | B 310,271 | 3,923,689 | Dec. 2, 1975 |
| B 265,369 | 3,925,245 | Dec. 9, 1975 | B 310,740 | 3,985,686 | Oct. 12, 1976 |
| B 265,727 | 3,914,479 | Oct. 21, 1975 | B 311,313 | 3,925,142 | Dec. 9, 1975 |
| B 265,862 | 3,915,915 | Oct. 28, 1975 | B 311,317 | 3,918,975 | Nov. 11, 1975 |
| B 266,195 | 3,923,599 | Dec. 2, 1975 | B 311,413 | 3,925,515 | Dec. 9, 1975 |
| B 269,673 | 3,914,377 | Oct. 21, 1975 | B 311,910 | 3,924,357 | Dec. 9, 1975 |
| B 270,089 | 3,923,875 | Dec. 2, 1975 | B 311,977 | 3,925,233 | Dec. 9,1975 |
| B 271,104 | 3,925,400 | Dec. 9, 1975 | B 312,139 | 3,925,530 | Dec. 9, 1975 |
| B 274,945 | 3,924,992 | Dec. 9, 1975 | B 312,477 | 3,923,714 | Dec. 2, 1975 |
| B 275,426 | 3,925,168 | Dec. 9, 1975 | B 313,098 | 3,925,045 | Dec. 9, 1975 |
| B 276,271 | 3,916,028 | Oct. 28, 1975 | B 313,531 | 3,925,548 | Dec. 9, 1975 |
| B 276,560 | 3,916,030 | Oct. 28, 1975 | B 313,594 | 3,924,626 | Dec. 9, 1975 |
| B 276,993 | 3,948,823 | Apr. 6, 1976 | B 313,900 | 3,915,932 | Oct. 28, 1975 |
| B 277,449 | 3,924,048 | Dec. 2, 1975 | B 314,049 | 3,920,588 | Nov. 18, 1975 |
| B 278,491 | 3,921,170 | Nov. 18, 1975 | B 314,255 | 3,923,764 | Dec. 2, 1975 |
| B 278,991 | 3,914,469 | Oct. 21, 1975 | B 314,271 | 3,921,845 | Nov. 25, 1975 |
| B 279,583 | 3,923,749 | Dec. 2, 1975 | B 314,489 | 3,925,016 | Dec. 9, 1975 |
| B 280,015 | 3,925,378 | Dec. 9, 1975 | B 314,800 | 3,930,087 | Dec. 30, 1975 |
| B 280,395 | 3,919,604 | Nov. 11, 1975 | B 314,977 | 3,923,459 | Dec. 2, 1975 |
| B 281,341 | 3,920,643 | Nov. 18, 1975 | B 315,363 | 3,920,673 | Nov. 18, 1975 |
| B 281,943 | 3,924,013 | Dec. 2, 1975 | B 315,397 | 3,923,963 | Dec. 2, 1975 |
| B 282,081 | 3,913,483 | Oct. 21, 1975 | B 315,731 | 3,914,108 | Oct. 21, 1975 |
| B 282,252 | 3,924,997 | Dec. 9, 1975 | B 316,014 | 3,920,861 | Nov. 18, 1975 |
| B 282,390 | 3,924,576 | Dec. 9,1975 | B 316,239 | 3,913,546 | Oct. 21, 1975 |
| B 282,819 | 3,982,932 | Sep. 28, 1976 | B 316,422 | 4,016,206 | Apr. 19, 1977 |
| B 283,124 | 3,923,512 | Dec. 2, 1975 | B 316,917 | 3,925,494 | Dec. 9, 1975 |
| B 283,300 | 3,925,011 | Dec. 9, 1975 | B 317,080 | 3,925,324 | Dec. 9, 1975 |
| B 284,297 | 3,913,722 | Oct. 21, 1975 | B 317,347 | 3,923,552 | Dec. 2, 1975 |
| B 284,427 | 3,952,812 | Apr. 27, 1976 | B 317,624 | 3,925,167 | Dec. 9, 1975 |
| B 285,200 | 3,923,680 | Dec. 2, 1975 | B 318,195 | 3,915,699 | Oct. 28, 1975 |
| B 285,796 | 3,914,303 | Oct. 21, 1975 | B 318,618 | 3,915,365 | Oct. 28, 1975 |
| B 286,499 | 3,914,129 | Oct. 21, 1975 | B 318,640 | 3,925,186 | Dec. 9, 1975 |
| B 286,614 | 3,924,696 | Dec. 9, 1975 | B 318,745 | 3,916,571 | Nov. 4, 1975 |
| B 286,913 | 3,928,696 | Dec. 23, 1975 | B 319,226 | 3,925,082 | Dec. 9, 1975 |
| B 287,164 | 3,914,139 | Oct. 21, 1975 | B 319,339 | 3,916,056 | Oct. 28, 1975 |
| B 287,270 | 3,924,825 | Dec. 9, 1975 | B 319,402 | 3,919,568 | Nov. 11, 1975 |

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## JANUARY 28, 1975 NOW ISSUED AS PATENTS—CONTINUED

| DOCUMENT NUMBER | PATENT NUMBER | ISSUE DATE | DOCUMENT NUMBER | PATENT NUMBER | ISSUE DATE |
|---|---|---|---|---|---|
| B 319,414 | 3,928,666 | Dec. 23, 1975 | B 345,422 | 3,914,392 | Oct. 21, 1975 |
| B 320,261 | 3,924,033 | Dec. 2, 1975 | B 345,527 | 3,927,365 | Dec. 16, 1975 |
| B 320,452 | 3,925,083 | Dec. 9, 1975 | B 345,567 | 3,913,985 | Oct. 21, 1975 |
| B 320,603 | 3,915,571 | Oct. 28, 1975 | B 346,044 | 3,988,405 | Oct. 26, 1976 |
| B 321,018 | 3,921,623 | Nov. 25, 1975 | B 346,145 | 3,913,293 | Oct. 21, 1975 |
| B 321,101 | 3,917,163 | Nov. 4, 1975 | B 346,210 | 3,916,142 | Oct. 28, 1975 |
| B 321,938 | 3,923,889 | Dec. 2, 1975 | B 346,350 | 3,915,824 | Oct. 28, 1975 |
| B 322,182 | 3,925,390 | Dec. 9, 1975 | B 346,487 | 3,927,406 | Dec. 16, 1975 |
| B 322,239 | 3,920,973 | Nov. 18, 1975 | B 346,585 | 3,913,820 | Oct. 21, 1975 |
| B 322,564 | 3,914,373 | Oct. 21, 1975 | B 346,613 | 3,923,545 | Dec. 2, 1975 |
| B 322,621 | 3,920,863 | Nov. 18,1975 | B 346,901 | 3,915,583 | Oct. 28, 1975 |
| B 322,777 | 3,924,382 | Dec. 9, 1975 | B 348,083 | 3,923,774 | Dec. 2, 1975 |
| B 323,127 | 3,923,967 | Dec. 2, 1975 | B 348,383 | 3,923,452 | Dec. 2, 1975 |
| B 323,191 | 3,914,566 | Oct. 21, 1975 | B 348,495 | 3,914,654 | Oct. 21, 1975 |
| B 323,203 | 3,916,165 | Oct. 28, 1975 | B 348,558 | 3,914,109 | Oct. 21, 1975 |
| B 323,568 | 3,920,536 | Nov. 18, 1975 | B 349,141 | 3,915,363 | Oct. 28, 1975 |
| B 323,666 | 3,924,568 | Dec. 9, 1975 | B 349,177 | 3,914,033 | Oct. 21, 1975 |
| B 324,495 | 3,928,664 | Dec. 23, 1975 | B 349,231 | 3,915,831 | Oct. 28, 1975 |
| B 324,503 | 3,928,524 | Dec. 23, 1975 | B 349,321 | 3,916,103 | Oct. 28, 1975 |
| B 324,505 | 3,925,294 | Dec. 9, 1975 | B 349,948 | 3,914,557 | Oct. 21, 1975 |
| B 324,739 | 3,924,990 | Dec. 9, 1975 | B 350,025 | 3,927,415 | Dec. 16, 1975 |
| B 324,879 | 3,923,538 | Dec. 2, 1975 | B 350,143 | 3,924,419 | Dec. 9, 1975 |
| B 325,102 | 3,924,355 | Dec. 9, 1975 | B 350,219 | 3,917,802 | Nov. 4, 1975 |
| B 325,261 | 3,921,304 | Nov. 25,1975 | B 350,245 | 3,914,331 | Oct. 21, 1975 |
| B 326,514 | 3,925,080 | Dec. 9, 1975 | B 350,523 | 3,924,726 | Dec. 9, 1975 |
| B 327,109 | 3,925,350 | Dec. 9, 1975 | B 350,589 | 3,927,419 | Dec. 16, 1975 |
| B 327,363 | 3,923,504 | Dec. 2, 1975 | B 350,708 | 3,923,871 | Dec. 2, 1975 |
| B 327,612 | 3,925,620 | Dec. 9, 1975 | B 350,843 | 3,915,461 | Oct. 28, 1975 |
| B 327,674 | 3,918,540 | Nov. 11, 1975 | B 351,055 | 3,914,074 | Oct. 21, 1975 |
| B 327,899 | 3,925,674 | Dec. 9, 1975 | B 351,218 | 3,914,186 | Oct. 21, 1975 |
| B 328,164 | 3,914,703 | Oct. 21, 1975 | B 351,222 | 3,921,179 | Nov. 18, 1975 |
| B 328,200 | 3,916,031 | Oct. 28, 1975 | B 351,348 | 3,923,563 | Dec. 2, 1975 |
| B 328,205 | 3,914,106 | Oct. 21, 1975 | B 351,421 | 3,914,733 | Oct. 21, 1975 |
| B 328,210 | 3,914,275 | Oct. 21, 1975 | B 351,493 | 3,914,758 | Oct. 21, 1975 |
| B 328,870 | 3,916,486 | Nov. 4, 1975 | B 351,535 | 3,915,239 | Oct. 28, 1975 |
| B 329,115 | 3,924,727 | Dec. 9, 1975 | B 351,665 | 3,919,701 | Nov. 11, 1975 |
| B 329,476 | 3,920,562 | Nov. 18, 1975 | B 351,672 | 3,914,000 | Oct. 21, 1975 |
| B 329,612 | 3,925,128 | Dec. 9, 1975 | B 351,735 | 3,913,385 | Oct. 21, 1975 |
| B 329,787 | 3,920,688 | Nov. 18, 1975 | B 351,863 | 3,914,700 | Oct. 21, 1975 |
| B 329,816 | 3,923,947 | Dec. 2, 1975 | B 351,883 | 3,924,657 | Dec. 9, 1975 |
| B 330,536 | 3,925,452 | Dec. 9, 1975 | B 351,926 | 3,914,133 | Oct. 21, 1975 |
| B 330,828 | 3,913,589 | Oct. 21, 1975 | B 351,939 | 3,913,480 | Oct. 21, 1975 |
| B 331,417 | 3,914,157 | Oct. 21, 1975 | B 352,445 | 3,928,746 | Dec. 23, 1975 |
| B 331,557 | 3,916,577 | Nov. 4, 1975 | B 352,934 | 3,913,692 | Oct. 21, 1975 |
| B 331,895 | 3,916,403 | Oct. 28, 1975 | B 352,950 | 3,922,590 | Nov. 25, 1975 |
| B 332,527 | 3,924,017 | Dec. 2, 1975 | B 352,965 | 3,921,926 | Nov. 25, 1975 |
| B 332,811 | 3,924,359 | Dec. 9, 1975 | B 353,317 | 3,916,446 | Nov. 4, 1975 |
| B 333,876 | 3,921,208 | Nov. 18, 1975 | B 353,387 | 3,924,404 | Dec. 9, 1975 |
| B 333,928 | 3,927,172 | Dec. 16, 1975 | B 353,546 | 3,913,273 | Oct. 21, 1975 |
| B 334,251 | 3,924,719 | Dec. 9, 1975 | B 354,008 | 3,925,081 | Dec. 9, 1975 |
| B 334,868 | 3,919,469 | Nov. 11, 1975 | B 354,098 | 3,925,547 | Dec. 9, 1975 |
| B 334,985 | 3,923,912 | Dec. 2, 1975 | B 354,145 | 3,927,279 | Dec. 16, 1975 |
| B 335,670 | 3,928,686 | Dec. 23, 1975 | B 354,296 | 3,914,580 | Oct. 21, 1975 |
| B 335,741 | 3,925,615 | Dec. 9, 1975 | B 354,510 | 3,928,658 | Dec. 23, 1975 |
| B 335,773 | 3,920,953 | Nov. 18, 1975 | B 354,889 | 3,913,204 | Oct. 21, 1975 |
| B 336,129 | 3,923,606 | Dec. 2, 1975 | B 354,979 | 3,914,251 | Oct. 21, 1975 |
| B 336,243 | 3,925,422 | Dec. 9, 1975 | B 355,095 | 3,925,656 | Dec. 9, 1975 |
| B 336,345 | 3,925,179 | Dec. 9, 1975 | B 355,269 | 3,914,561 | Oct. 21, 1975 |
| B 336,652 | 3,914,211 | Oct. 21, 1975 | B 355,510 | 3,913,704 | Oct. 21, 1975 |
| B 336,902 | 3,918,897 | Nov. 11, 1975 | B 355,595 | 3,925,649 | Dec. 9, 1975 |
| B 336,946 | 3,919,425 | Nov. 11, 1975 | B 355,876 | 3,925,685 | Dec. 9, 1975 |
| B 336,978 | 3,923,968 | Dec. 2, 1975 | B 356,032 | 3,928,636 | Dec. 23, 1975 |
| B 337,235 | 3,919,386 | Nov. 11, 1975 | B 356,253 | 3,925,025 | Dec. 9, 1975 |
| B 337,409 | 3,925,258 | Dec. 9, 1975 | B 356,602 | 3,927,393 | Dec. 16, 1975 |
| B 337,442 | 3,913,658 | Oct. 21, 1975 | B 356,724 | 3,924,586 | Dec. 9, 1975 |
| B 337,703 | 3,914,690 | Oct. 21, 1975 | B 357,039 | 3,924,406 | Dec. 9, 1975 |
| B 337,787 | 3,923,506 | Dec. 2, 1975 | B 357,057 | 3,913,738 | Oct. 21, 1975 |
| B 339,059 | 3,924,822 | Dec. 9, 1975 | B 357,131 | 3,924,453 | Dec. 9, 1975 |
| B 339,218 | 3,925,121 | Dec. 9, 1975 | B 357,402 | 3,914,180 | Oct. 21, 1975 |
| B 339,699 | 3,933,527 | Jan. 20, 1976 | B 357,682 | 3,924,973 | Dec. 9, 1975 |
| B 339,838 | 3,930,221 | Dec. 30, 1975 | B 357,803 | 3,919,470 | Nov. 11, 1975 |
| B 340,212 | 3,922,645 | Nov. 25, 1975 | B 358,174 | 3,924,958 | Dec. 9, 1975 |
| B 340,833 | 3,925,208 | Dec. 9, 1975 | B 358,244 | 3,913,411 | Oct. 21, 1975 |
| B 341,579 | 3,913,363 | Oct. 21, 1975 | B 358,311 | 3,923,561 | Dec. 2, 1975 |
| B 342,084 | 3,928,694 | Dec. 23, 1975 | B 358,939 | 3,924,713 | Dec. 9, 1975 |
| B 342,423 | 3,925,334 | Dec. 9, 1975 | B 359,174 | 3,914,117 | Oct. 21, 1975 |
| B 342,886 | 3,923,507 | Dec. 2, 1975 | B 359,187 | 3,924,525 | Dec. 9, 1975 |
| B 343,136 | 3,919,453 | Nov. 11, 1975 | B 359,540 | 3,915,235 | Oct. 28, 1975 |
| B 343,240 | 3,925,693 | Dec. 9, 1975 | B 359,740 | 3,936,212 | Feb. 3, 1976 |
| B 343,506 | 3,916,021 | Oct. 28, 1975 | B 359,791 | 3,929,430 | Dec. 30, 1975 |
| B 343,577 | 3,921,165 | Nov. 18, 1975 | B 359,825 | 3,921,344 | Nov. 25, 1975 |
| B 344,203 | 3,928,719 | Dec. 23, 1975 | B 359,946 | 3,914,132 | Oct. 21, 1975 |
| B 344,479 | 3,924,042 | Dec. 2, 1975 | B 359,947 | 3,914,653 | Oct. 21, 1975 |
| B 345,060 | 3,916,018 | Oct. 28, 1975 | B 360,208 | 3,923,750 | Dec. 2, 1975 |
| B 345,384 | 3,916,146 | Oct. 28, 1975 | B 360,296 | 3,916,720 | Nov. 4, 1975 |
| B 345,390 | 3,940,343 | Feb. 24, 1976 | B 360,719 | 3,915,715 | Oct. 28, 1975 |

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## JANUARY 28, 1975 NOW ISSUED AS PATENTS—CONTINUED

| DOCUMENT NUMBER | PATENT NUMBER | ISSUE DATE | DOCUMENT NUMBER | PATENT NUMBER | ISSUE DATE |
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| B 360,910 | 3,925,696 | Dec. 9, 1975 | B 382,840 | 3,922,007 | Nov. 25, 1975 |
| B 361,265 | 3,923,569 | Dec. 2, 1975 | B 383,465 | 3,927,412 | Dec. 16, 1975 |
| B 361,347 | 3,914,642 | Oct. 21, 1975 | B 383,581 | 3,925,318 | Dec. 9, 1975 |
| B 361,443 | 3,927,405 | Dec. 16, 1975 | B 383,852 | 3,914,246 | Oct. 21, 1975 |
| B 361,569 | 3,914,554 | Oct. 21, 1975 | B 384,499 | 3,925,135 | Dec. 9, 1975 |
| B 361,604 | 3,922,702 | Nov. 25, 1975 | B 384,658 | 3,913,452 | Oct. 21, 1975 |
| B 361,734 | 3,915,764 | Oct. 28, 1975 | B 384,773 | 3,915,416 | Oct. 28, 1975 |
| B 362,589 | 3,914,012 | Oct. 21, 1975 | B 385,210 | 3,913,406 | Oct. 21, 1975 |
| B 363,205 | 3,923,744 | Dec. 2, 1975 | B 386,403 | 3,924,895 | Dec. 9, 1975 |
| B 363,337 | 3,928,639 | Dec. 23, 1975 | B 386,592 | 3,925,305 | Dec. 9, 1975 |
| B 363,457 | 3,922,595 | Nov. 25, 1975 | B 387,039 | 3,924,510 | Dec. 9, 1975 |
| B 363,674 | 3,929,716 | Dec. 30, 1975 | B 387,331 | 3,913,701 | Oct. 21, 1975 |
| B 363,892 | 3,913,395 | Oct. 21, 1975 | B 387,363 | 3,927,378 | Dec. 16, 1975 |
| B 363,962 | 3,921,826 | Nov. 25, 1975 | B 387,687 | 3,918,151 | Nov. 11, 1975 |
| B 364,022 | 3,913,499 | Oct. 21, 1975 | B 387,761 | 3,914,245 | Oct. 21, 1975 |
| B 364,163 | 3,916,092 | Oct. 28, 1975 | B 387,790 | 3,925,380 | Dec. 9, 1975 |
| B 364,241 | 3,916,668 | Nov. 4, 1975 | B 387,818 | 3,918,935 | Nov. 11, 1975 |
| B 364,334 | 3,924,670 | Dec. 9, 1975 | B 388,580 | 3,923,712 | Dec. 2, 1975 |
| B 364,528 | 3,919,510 | Nov. 11, 1975 | B 389,070 | 3,914,171 | Oct. 21, 1975 |
| B 364,786 | 3,921,673 | Nov. 25, 1975 | B 389,295 | 3,914,631 | Oct. 21, 1975 |
| B 364,910 | 3,925,335 | Dec. 9, 1975 | B 389,327 | 3,924,504 | Dec. 9, 1975 |
| B 365,371 | 3,988,181 | Oct. 26, 1976 | B 389,639 | 3,914,626 | Oct. 21, 1975 |
| B 365,490 | 3,918,527 | Nov. 11, 1975 | B 389,726 | 3,921,010 | Nov. 18, 1975 |
| B 365,834 | 3,914,702 | Oct. 21, 1975 | B 389,807 | 3,922,623 | Nov. 25, 1975 |
| B 365,841 | 3,925,628 | Dec. 9, 1975 | B 389,932 | 3,913,268 | Oct. 21, 1975 |
| B 365,855 | 3,917,258 | Nov. 4, 1975 | B 389,933 | 3,913,267 | Oct. 21, 1975 |
| B 366,287 | 3,924,946 | Dec. 9, 1975 | B 390,679 | 3,913,668 | Oct. 21, 1975 |
| B 366,402 | 3,928,053 | Dec. 23, 1975 | B 390,732 | 3,913,878 | Oct. 21, 1975 |
| B 366,589 | 3,914,719 | Oct. 21, 1975 | B 391,184 | 3,914,214 | Oct. 21, 1975 |
| B 367,021 | 3,914,752 | Oct. 21, 1975 | B 391,210 | 3,914,220 | Oct. 21, 1975 |
| B 367,040 | 3,924,775 | Dec. 9, 1975 | B 391,437 | 3,915,416 | Oct. 28, 1975 |
| B 367,661 | 3,914,158 | Oct. 21, 1975 | B 391,509 | 3,925,175 | Dec. 9, 1975 |
| B 367,739 | 3,923,648 | Dec. 2, 1975 | B 391,675 | 3,916,017 | Oct. 28, 1975 |
| B 367,812 | 3,924,789 | Dec. 9, 1975 | B 392,154 | 3,923,809 | Dec. 2, 1975 |
| B 368,081 | 3,924,691 | Dec. 9, 1975 | B 392,242 | 3,926,636 | Dec. 16, 1975 |
| B 368,387 | 3,924,923 | Dec. 9, 1975 | B 392,696 | 3,916,175 | Oct. 28, 1975 |
| B 368,392 | 3,913,812 | Oct. 21, 1975 | B 392,732 | 3,914,903 | Oct. 21, 1975 |
| B 368,397 | 3,914,677 | Oct. 21, 1975 | B 392,753 | 3,916,341 | Oct. 28, 1975 |
| B 368,862 | 3,925,549 | Dec. 9, 1975 | B 392,894 | 3,914,763 | Oct. 21, 1975 |
| B 369,563 | 3,924,449 | Dec. 9, 1975 | B 393,163 | 3,914,535 | Oct. 21, 1975 |
| B 369,607 | 3,923,786 | Dec. 2, 1975 | B 393,347 | 3,985,800 | Oct. 12, 1976 |
| B 369,997 | 3,913,533 | Oct. 21, 1975 | B 393,970 | 3,914,638 | Oct. 21, 1975 |
| B 370,453 | 3,964,101 | Jun. 15, 1976 | B 394,088 | 3,914,740 | Oct. 21, 1975 |
| B 370,706 | 3,925,242 | Dec. 9, 1975 | B 394,188 | 3,924,591 | Dec. 9, 1975 |
| B 371,073 | 3,930,135 | Dec. 30, 1975 | B 394,300 | 3,914,159 | Oct. 21, 1975 |
| B 371,085 | 3,923,783 | Dec. 2, 1975 | B 394,712 | 3,916,306 | Oct. 28, 1975 |
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| B 371,805 | 3,914,433 | Oct. 21, 1975 | B 395,496 | 3,919,435 | Nov. 11, 1975 |
| B 371,836 | 3,923,541 | Dec. 2, 1975 | B 395,671 | 3,920,418 | Nov. 18, 1975 |
| B 372,823 | 3,924,660 | Dec. 9, 1975 | B 395,889 | 3,913,190 | Oct. 21, 1975 |
| B 373,051 | 3,914,162 | Oct. 21, 1975 | B 396,025 | 3,913,869 | Oct. 21, 1975 |
| B 373,297 | 3,924,436 | Dec. 9, 1975 | B 396,551 | 3,921,929 | Nov. 25, 1975 |
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| B 375,652 | 3,921,303 | Nov. 25, 1975 | B 398,262 | 3,913,481 | Oct. 21, 1975 |
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| B 376,654 | 3,922,513 | Nov. 25, 1975 | B 398,597 | 3,913,743 | Oct. 21, 1975 |
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| B 376,799 | 3,913,955 | Oct. 21, 1975 | B 399,292 | 3,914,810 | Oct. 28, 1975 |
| B 377,172 | 3,918,255 | Nov. 11, 1975 | B 399,304 | 3,919,567 | Nov. 11, 1975 |
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| B 377,869 | 3,917,002 | Nov. 4, 1975 | B 400,080 | 3,925,163 | Dec. 9, 1975 |
| B 378,621 | 3,923,840 | Dec. 2, 1975 | B 400,293 | 3,923,719 | Dec. 2, 1975 |
| B 379,038 | 3,923,994 | Dec. 2, 1975 | B 400,310 | 3,915,507 | Oct. 28, 1975 |
| B 379,172 | 3,914,379 | Oct. 21, 1975 | B 401,133 | 3,924,443 | Dec. 9, 1975 |
| B 379,282 | 3,913,462 | Oct. 21, 1975 | B 401,992 | 3,924,898 | Dec. 9, 1975 |
| B 379,955 | 3,913,157 | Oct. 21, 1975 | B 402,065 | 3,925,413 | Dec. 9, 1975 |
| B 380,014 | 3,921,915 | Nov. 25, 1975 | B 402,555 | 3,914,688 | Oct. 21, 1975 |
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| B 380,312 | 3,913,953 | Oct. 21, 1975 | B 403,990 | 3,914,684 | Oct. 21, 1975 |
| B 380,338 | 3,924,873 | Dec. 9, 1975 | B 403,996 | 3,916,016 | Oct. 28, 1975 |
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Pasin, Mario A., 244,479.
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Surie, Patricia; Shapiro, Rosella; and Shapiro, Mathilde N., 244,488.
Shapiro, Rosella: *See—*
Surie, Patricia; Shapiro, Rosella; and Shapiro, Mathilde N., 244,488.
Solar, Allan Joseph: *See—*
Crump, Richard Arthur; Gibson, John Scott; and Solar, Allan Joseph, 244,454.
Crump, Richard Arthur; Gibson, John Scott; and Solar, Allan Joseph, 244,455.
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Soundmasters, Inc.: *See—*
Aquilino, Augustino A., 244,467.

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Hayakawa, Toshio; and Takayama, Masahiro, 244,440.
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Schonbrun, Tibor; and Tremblay, Victorin, 244,406.

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Berkowitz, Benjamin; Luedtke, Arthur; Kilpatrick, William L.; and Bentley, William Ferrel, 244,466.

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Schieser, Warren J.; and Vickers, Stanley E., 244,427.

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Coles, Allen E., 244,413.

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Hiller, Milton, 244,472.

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Ohshiro, Masao, 244,452.
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Greiss, Rashad Shaker; and Yates, James Stephen, 244,442.

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Lohneis, Earl R.; Zankl, Frank; Stevens, Clifford Brooks; and Green, Thomas J., 244,445.

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# CLASSIFICATION OF PATENTS

## ISSUED MAY 24, 1977

NOTE.—First number, class; second number, subclass; third number, patent number

**CLASS 2**

| | |
|---|---|
| 24 | 4,024,584 |
| 153 | 4,024,585 |
| 414 | 4,024,586 |
| 424 | 4,024,587 |

**CLASS 3**

| | |
|---|---|
| 1.91 | 4,024,588 |

**CLASS 4**

| | |
|---|---|
| 42 | 4,024,589 |
| 166 | 4,024,590 |

**CLASS 5**

| | |
|---|---|
| 321 | 4,024,591 |

**CLASS 8**

| | |
|---|---|
| 4 | 4,025,300 |
| 10.1 | 4,025,301 |
| 17 | 4,025,302 |
| 28 | 4,025,303 |
| 151 | 4,025,304 |
| 176 | 4,025,305 |

**CLASS 9**

| | |
|---|---|
| 1.2 | 4,024,592 |

**CLASS 10**

| | |
|---|---|
| 86 R | 4,024,593 |

**CLASS 12**

| | |
|---|---|
| 4.2 | 4,024,594 |

**CLASS 13**

| | |
|---|---|
| 6 | 4,025,713 |

**CLASS 14**

| | |
|---|---|
| 1 | 4,024,595 |

**CLASS 15**

| | |
|---|---|
| 21 D | 4,024,596 |
| 28 | 4,024,597 |
| 53 A | 4,024,598 |
| 311 | 4,024,599 |

**CLASS 16**

| | |
|---|---|
| 31 R | 4,024,600 |
| | 4,024,601 |

**CLASS 17**

| | |
|---|---|
| 1 F | 4,024,602 |
| 11 | 4,024,603 |

**CLASS 23**

| | |
|---|---|
| 230 B | 4,025,306 |
| | 4,025,307 |
| | 4,025,310 |
| 230 PC | 4,025,309 |
| 230 R | 4,025,308 |
| 253 R | 4,025,311 |
| 259.5 | 4,025,312 |

**CLASS 24**

| | |
|---|---|
| 16 R | 4,024,604 |
| 33 P | 4,024,605 |
| 67.7 | 4,024,606 |
| 201 HE | 4,024,607 |
| 236 | 4,024,608 |
| 274 R | 4,024,609 |

**CLASS 28**

| | |
|---|---|
| 1.3 | 4,024,610 |
| | 4,024,611 |
| 72.2 F | 4,024,612 |

**CLASS 29**

| | |
|---|---|
| 25.13 | 4,024,613 |
| 33 K | 4,024,614 |
| 105 R | 4,024,615 |
| 149.5 B | 4,024,616 |
| 156.63 | 4,024,617 |
| 157 C | 4,024,618 |
| 157.3 C | 4,024,620 |
| 157.3 R | 4,024,619 |
| 417 | 4,024,622 |
| 421 R | 4,024,623 |
| 527.7 | 4,024,624 |
| 570 | 4,024,625 |
| 571 | 4,024,626 |
| 588 | 4,024,627 |
| 598 | 4,024,628 |
| 624 | 4,024,630 |
| 625 | 4,024,629 |
| | 4,024,631 |
| 736 | 4,024,632 |
| 822 | 4,024,621 |

**CLASS 30**

| | |
|---|---|
| 273 | 4,024,633 |
| 276 | 4,024,635 |
| 341 | 4,024,634 |

**CLASS 32**

| | |
|---|---|
| 2 | 4,024,636 |
| | 4,024,637 |
| 10 A | 4,024,638 |
| | 4,024,639 |
| 32 | 4,024,640 |
| 33 | 4,024,642 |
| 63 | 4,024,643 |

**CLASS 33**

| | |
|---|---|
| 30 B | 4,024,641 |
| 126.7 R | 4,024,644 |
| 129 | 4,024,645 |
| 174 P | 4,024,646 |

**CLASS 34**

| | |
|---|---|
| 12 | 4,024,647 |
| 92 | 4,024,648 |
| 155 | 4,024,649 |

**CLASS 35**

| | |
|---|---|
| 9 R | 4,024,650 |
| 12 S | 4,024,651 |

**CLASS 36**

| | |
|---|---|
| 14 | 4,024,652 |

**CLASS 37**

| | |
|---|---|
| 42 R | 4,024,653 |
| 53 | 4,024,654 |
| 58 | 4,024,655 |

**CLASS 40**

| | |
|---|---|
| 121 | 4,024,656 |
| 126 R | 4,024,657 |
| 130 D | 4,024,658 |
| 155 | 4,024,659 |
| 308 | 4,024,660 |
| 337 | 4,024,661 |
| 352 | 4,024,662 |

**CLASS 42**

| | |
|---|---|
| 67 | 4,024,663 |
| 70 F | 4,024,664 |

**CLASS 43**

| | |
|---|---|
| 6 | 4,024,665 |
| 18 R | 4,024,666 |
| 19 | 4,024,667 |
| 35 | 4,024,668 |
| 44.99 | 4,024,669 |

**CLASS 44**

| | |
|---|---|
| 52 | 4,025,315 |
| 58 | 4,025,316 |

**CLASS 47**

| | |
|---|---|
| 73 | 4,024,670 |

**CLASS 48**

| | |
|---|---|
| 86 R | 4,025,317 |
| 213 | 4,025,318 |

**CLASS 49**

| | |
|---|---|
| 104 | 4,024,671 |

**CLASS 51**

| | |
|---|---|
| 57 | 4,024,672 |
| 131 | 4,024,673 |
| 208 | 4,025,319 |
| 268 | 4,024,674 |
| 296 | 4,024,675 |

**CLASS 52**

| | |
|---|---|
| 2 | 4,024,679 |
| 18 | 4,024,680 |
| 60 | 4,024,681 |
| 90 | 4,024,682 |
| 98 | 4,024,683 |
| 127 | 4,024,684 |
| 228 | 4,024,687 |
| 278 | 4,024,685 |
| 282 | 4,024,686 |
| 378 | 4,024,688 |
| 396 | 4,024,689 |
| 397 | 4,024,690 |
| 656 | 4,024,691 |

**CLASS 53**

| | |
|---|---|
| 22 A | 4,024,692 |
| 186 | 4,024,693 |
| 282 | 4,024,694 |

**CLASS 55**

| | |
|---|---|
| 1 | 4,025,320 |
| 33 | 4,025,321 |
| 48 | 4,025,322 |
| 139 | 4,025,323 |
| 179 | 4,025,324 |
| 357 | 4,025,325 |

**CLASS 56**

| | |
|---|---|
| 15.4 | 4,024,695 |

**CLASS 57**

| | |
|---|---|
| 15 | 4,024,696 |
| 34 HS | 4,024,697 |
| 34.5 | 4,024,698 |
| 58.91 | 4,024,699 |
| 144 | 4,024,700 |

**CLASS 58**

| | |
|---|---|
| 23 A | 4,024,676 |
| 23 R | 4,024,677 |
| | 4,024,678 |
| 144 | 4,024,701 |

**CLASS 60**

| | |
|---|---|
| 39.03 | 4,024,703 |
| 39.16 C | 4,024,705 |
| 39.16 S | 4,025,221 |
| 39.25 | 4,024,704 |
| 39.27 | 4,024,702 |
| 274 | 4,024,706 |
| 276 | 4,024,707 |
| 278 | 4,024,708 |
| 397 | 4,024,709 |
| 420 | 4,024,710 |
| 423 | 4,024,711 |
| 535 | 4,024,712 |
| 547 | 4,024,713 |
| 572 | 4,024,714 |
| 641 | 4,024,715 |

**CLASS 61**

| | |
|---|---|
| 13 | 4,024,716 |
| 29 | 4,024,717 |
| 50 | 4,024,719 |
| 69 R | 4,024,718 |
| 72.7 | 4,024,721 |
| 98 | 4,024,723 |
| 110 | 4,024,724 |

**CLASS 62**

| | |
|---|---|
| 2 | 4,024,726 |
| 6 | 4,024,727 |
| 55 | 4,024,720 |
| 79 | 4,024,728 |
| 81 | 4,024,722 |
| 175 | 4,025,326 |
| 176 E | 4,024,725 |
| 259 | 4,024,730 |
| 263 | 4,024,729 |
| 457 | 4,024,731 |

**CLASS 64**

| | |
|---|---|
| 27 CT | 4,024,732 |

**CLASS 65**

| | |
|---|---|
| 54 | 4,025,327 |
| 111 | 4,025,328 |

**CLASS 66**

| | |
|---|---|
| 50 A | 4,024,733 |
| 158 | 4,024,734 |

**CLASS 68**

| | |
|---|---|
| 16 | 4,024,735 |

**CLASS 70**

| | |
|---|---|
| | 4,024,736 |
| 58 | 4,024,737 |
| 59 | 4,024,738 |
| 97 | 4,024,739 |
| 175 | 4,024,740 |
| 233 | 4,024,741 |

**CLASS 71**

| | |
|---|---|
| 3 | 4,025,329 |
| 30 | 4,025,330 |
| 86 | 4,025,331 |
| | 4,025,332 |
| 94 | 4,025,333 |

**CLASS 72**

| | |
|---|---|
| 42 | 4,024,742 |
| 54 | 4,024,743 |
| 56 | 4,024,744 |
| 201 | 4,024,745 |
| 249 | 4,024,746 |
| 325 | 4,024,747 |
| 391 | 4,024,748 |
| 421 | 4,024,749 |

**CLASS 73**

| | |
|---|---|
| 6 | 4,024,750 |
| 15 R | 4,024,751 |
| 17 A | 4,024,752 |
| 17 R | 4,024,753 |
| 63 | 4,024,754 |
| 105 | 4,024,755 |
| 132 | 4,024,756 |
| 162 | Re.29,227 |
| | 4,024,757 |
| 170 A | 4,024,758 |
| 194 A | 4,024,760 |
| 194 B | 4,024,759 |
| 204 | 4,024,761 |
| 228 | 4,024,762 |
| 339 R | 4,024,763 |
| 340 | 4,024,764 |
| 422 R | 4,024,766 |
| 422 TC | 4,024,765 |
| 432 A | 4,024,767 |
| 432 PS | 4,024,768 |

**CLASS 74**

| | |
|---|---|
| 5.12 | 4,024,769 |
| 18.2 | 4,024,770 |
| 198 | 4,024,771 |
| 230.16 | 4,024,772 |
| 233 | 4,024,773 |
| 606 R | 4,024,774 |
| 687 | 4,024,775 |
| 689 | 4,024,776 |

**CLASS 75**

| | |
|---|---|
| .5 R | 4,025,334 |
| 135 | 4,025,335 |
| 162 | 4,025,336 |
| 214 | 4,025,337 |

**CLASS 82**

| | |
|---|---|
| 36 A | 4,024,777 |
| 36 R | 4,024,778 |

**CLASS 83**

| | |
|---|---|
| 165 | 4,024,779 |
| 306 | 4,024,780 |
| 319 | 4,024,781 |
| 373 | 4,024,782 |
| 468 | 4,024,783 |
| 488 | 4,024,784 |
| 848 | 4,024,785 |

**CLASS 84**

| | |
|---|---|
| 1.01 | 4,024,786 |
| 1.16 | 4,024,787 |
| 267 | 4,024,788 |
| 477 R | 4,024,789 |

**CLASS 89**

| | |
|---|---|
| 1 E | 4,024,790 |
| 14 B | 4,024,791 |
| 129 B | 4,024,792 |
| 135 | 4,024,793 |

**CLASS 91**

| | |
|---|---|
| 189 A | 4,024,794 |
| 384 | 4,024,795 |
| 411 R | 4,024,796 |
| 412 | 4,024,797 |
| 436 | 4,024,798 |
| 499 | 4,024,799 |

**CLASS 92**

| | |
|---|---|
| 26 | 4,024,800 |
| 86.5 | 4,024,801 |
| 255 | 4,024,802 |

**CLASS 96**

| | |
|---|---|
| 1 R | 4,025,338 |
| 1.5 | 4,025,339 |
| | 4,025,342 |
| 1.6 | 4,025,340 |
| | 4,025,341 |
| 3 | 4,025,343 |
| 50 A | 4,025,344 |
| 60 R | 4,025,345 |
| 86 P | 4,025,346 |
| 101 | 4,025,347 |
| 115 R | 4,025,348 |
| 120 | 4,025,349 |

**CLASS 98**

| | |
|---|---|
| 33 R | 4,024,803 |

**CLASS 100**

| | |
|---|---|
| 5 | 4,024,804 |
| 12 | 4,024,805 |
| 52 | 4,024,806 |
| 53 | 4,024,807 |
| 89 | 4,024,808 |
| 100 | 4,024,809 |
| 116 | 4,024,810 |

**CLASS 101**

| | |
|---|---|
| 1 | 4,024,811 |
| 76 | 4,024,812 |
| 269 | 4,024,813 |
| 410 | 4,024,814 |
| 416 R | 4,024,815 |
| 426 | 4,024,816 |

**CLASS 102**

| | |
|---|---|
| 27 R | 4,024,817 |
| | 4,024,818 |
| 37.4 | 4,025,289 |
| 38 | 4,024,819 |

**CLASS 105**

| | |
|---|---|
| 368 R | 4,024,820 |
| 406 R | 4,024,821 |

**CLASS 106**

| | |
|---|---|
| 38.35 | 4,025,350 |
| 59 | 4,025,351 |
| 70 | 4,025,352 |
| 165 | 4,025,353 |
| 218 | 4,025,354 |
| 290 | 4,025,355 |

**CLASS 111**

| | |
|---|---|
| 34 | 4,024,822 |

**CLASS 112**

| | |
|---|---|
| 121.12 | 4,024,825 |
| 121.26 | 4,024,824 |
| 235 | 4,024,826 |

**CLASS 114**

| | |
|---|---|
| 162 | 4,024,827 |

**CLASS 116**

| | |
|---|---|
| 20 | 4,024,828 |
| 34 R | 4,024,829 |
| 86 | 4,024,830 |
| 119 | 4,024,831 |
| | 4,024,832 |
| 173 | 4,024,833 |

**CLASS 118**

| | |
|---|---|
| 7 | 4,024,834 |
| 52 | 4,024,835 |
| 323 | 4,024,836 |
| 505 | 4,024,837 |
| 661 | 4,024,838 |

**CLASS 123**

| | |
|---|---|
| 8.41 | 4,024,840 |
| 8.45 | 4,024,841 |
| | 4,024,842 |
| 32 ED | 4,024,843 |
| 41 R | 4,024,844 |
| 117 A | 4,024,845 |
| 119 A | 4,024,847 |
| 119 D | 4,024,846 |
| 136 | 4,024,848 |
| 141 | 4,024,849 |
| 198 F | 4,024,850 |

**CLASS 126**

| | |
|---|---|
| 30 | 4,024,851 |
| 39 J | 4,024,839 |
| 270 | 4,024,852 |
| 271 | 4,024,853 |
| 343.5 A | 4,024,854 |

**CLASS 127**

| | |
|---|---|
| 1 | 4,025,356 |
| 46 A | 4,025,357 |

**CLASS 128**

| | |
|---|---|
| 1 R | 4,024,855 |
| 2 F | 4,024,857 |
| 2 S | 4,024,856 |
| 4 | 4,024,858 |
| 12 | 4,024,859 |
| 84 R | 4,024,860 |
| 87 R | 4,024,861 |
| 132 D | 4,024,862 |
| 133 | 4,024,863 |
| 214 F | 4,024,864 |
| 218 PA | 4,024,865 |
| 276 | 4,024,866 |
| 287 | 4,024,867 |
| 303.15 | 4,024,869 |
| 321 | 4,024,870 |
| 335.5 | 4,024,871 |
| 348 | 4,024,872 |
| 349 B | 4,024,873 |
| 356 | 4,024,874 |
| 419 PG | 4,024,875 |
| 472 | 4,024,876 |

**CLASS 130**

| | |
|---|---|
| 30 H | 4,024,877 |

**CLASS 131**

| | |
|---|---|
| 84 B | 4,024,878 |

**CLASS 132**

| | |
|---|---|
| 79 F | 4,024,880 |
| 88.5 | 4,024,879 |

**CLASS 134**

| | |
|---|---|
| 3 | 4,025,358 |
| | 4,025,359 |
| 24 | 4,025,360 |
| 28 | 4,025,361 |
| 57 R | 4,025,362 |
| 102 | 4,025,363 |
| 104 | 4,024,881 |

**CLASS 137**

| | |
|---|---|
| 2 | 4,024,882 |
| 5 | 4,024,883 |
| 91 | 4,024,885 |
| 270 | 4,024,886 |
| 386 | 4,024,887 |
| 514 | 4,024,888 |
| 517 | 4,024,889 |
| 556.3 | 4,024,890 |
| 625.3 | 4,024,891 |
| 630.14 | 4,024,892 |

**CLASS 138**

| | |
|---|---|
| 89 | 4,024,893 |
| 121 | 4,024,894 |

**CLASS 139**

| | |
|---|---|
| 426 R | 4,024,895 |

**CLASS 141**

| | |
|---|---|
| 90 | 4,024,896 |
| 392 | 4,024,897 |

**CLASS 144**

| | |
|---|---|
| 134 D | 4,024,898 |

**CLASS 148**

| | |
|---|---|
| 1.5 | 4,025,364 |
| | 4,025,365 |
| 3 | 4,025,366 |
| 11.5 C | 4,025,367 |
| 36 | 4,025,368 |

**CLASS 149**

| | |
|---|---|
| 19.6 | 4,025,369 |
| 92 | 4,025,370 |

**CLASS 151**

| | |
|---|---|
| 14 R | 4,024,899 |

**CLASS 152**

| | |
|---|---|
| 214 | 4,024,900 |
| 354 | 4,024,901 |

**CLASS 156**

| | |
|---|---|
| 64 | 4,025,371 |
| 66 | 4,025,373 |
| 73.1 | 4,025,374 |
| 79 | 4,025,372 |
| | 4,025,375 |
| 145 | 4,025,376 |
| 242 | 4,025,377 |

272 4,025,378
306 4,025,379
355 4,025,380
446 4,025,381
497 4,025,382
502 4,025,384
530 4,025,383
568 4,025,385
617 SP 4,025,386

**CLASS 164**

97 4,024,902

**CLASS 165**

1 4,024,903
2 4,024,904
9 4,024,905
4,024,906
4,024,907
18 4,024,908
35 4,024,909
45 4,024,910
107 4,024,911

**CLASS 166**

57 4,024,912
72 4,024,913
251 4,024,914
256 4,024,915
288 4,024,916
292 4,024,917
293 4,024,918
303 4,024,919

**CLASS 171**

58 4,024,920

**CLASS 172**

4.5 4,024,823
146 4,024,921
801 4,024,922

**CLASS 173**

57 4,024,923
151 4,024,924

**CLASS 174**

18 4,025,714
36 4,025,715
52 FP 4,025,716
88 C 4,025,717

**CLASS 175**

85 4,024,925

**CLASS 176**

60 4,025,387
86 R 4,025,388

**CLASS 178**

67 4,025,719
69.1 4,025,720

**CLASS 179**

1 P 4,025,721
4,025,722
4,025,724
1 VL 4,025,723
15 AT 4,025,725
18 GF 4,025,726
18 HB 4,025,727
81 B 4,025,728
84 R 4,025,729
84 VF 4,025,730
100.4 R 4,025,731
100.41 K Re.29,232
107 FD 4,025,732
156 R 4,025,733
4,025,734
170 G 4,025,735
175.3 F 4,025,736
175.31 R 4,025,737

**CLASS 180**

65 D 4,024,926

**CLASS 182**

5 4,024,927
19 4,024,928
151 4,024,929

**CLASS 184**

15 B 4,024,930

**CLASS 188**

18 A 4,024,931
77 R 4,024,933
106 P 4,024,932
250 G 4,024,934

**CLASS 192**

4 A 4,024,936
4 R 4,024,935
13 R 4,024,937
106.2 4,024,938

**CLASS 193**

5 4,024,939

**CLASS 195**

31 F 4,025,389
66 B 4,025,390
68 4,025,391
99 4,025,392
103.5 M 4,025,393
115 4,025,394

**CLASS 197**

1 R 4,024,940
4,024,941
127 R 4,024,942
180 4,024,943

**CLASS 198**

394 4,024,944
424 4,024,945
570 4,024,946
707 4,024,947
796 4,024,948
818 4,024,949

**CLASS 200**

6 B 4,025,738
38 F 4,025,739
44 4,025,740
48 R 4,025,741
4,025,742
60 4,025,743
61.45 R 4,025,744
80 A 4,025,745
179 4,025,746
254 4,025,747
308 4,025,748

**CLASS 201**

39 4,025,395

**CLASS 203**

2 4,025,396
4,025,397
25 4,025,398

**CLASS 204**

2 4,025,399
10 4,025,400
38 B 4,025,404
98 4,025,401
4,025,405
157.1 R 4,025,406
159.14 4,025,407
159.24 4,025,402
4,025,403
163 R 4,025,408
181 4,025,409
192 E 4,025,411
192 R 4,025,410
195 R 4,025,412
252 4,025,413
297 R 4,025,414
300 EC 4,025,415

**CLASS 206**

150 4,024,950
217 4,024,951
221 4,024,952
344 4,024,953
387 4,024,954

**CLASS 208**

11 R 4,025,416
57 4,025,417
139 4,025,418

**CLASS 209**

3 4,025,419
73 4,024,956
74 R 4,025,420
85 4,025,421
111.5 4,025,422
121 4,024,955

**CLASS 210**

21 4,025,423
23 H 4,025,425
23 R 4,025,424
25 4,025,426
33 4,025,427
36 4,025,428
52 4,025,429
53 4,025,430
108 4,025,431
222 4,025,432
223 4,025,433
236 4,025,434
250 4,025,435
321 A 4,025,436
383 4,025,437
484 4,025,438
500 M 4,025,439

**CLASS 212**

144 4,024,957

**CLASS 213**

152 4,024,958

**CLASS 214**

1 A 4,024,960
1 BB 4,024,959
1 BD 4,024,961
2 4,024,962
6 BA 4,024,963
6 DK 4,024,964
6 P 4,024,965
7 4,024,966
9 4,024,967
75 G 4,024,968
135 R 4,024,969
147 G 4,024,970
450 4,024,971
650 R 4,024,972
674 4,024,973
762 4,024,974

**CLASS 215**

1 C 4,024,975
32 4,024,976

**CLASS 217**

12 R 4,024,977

**CLASS 219**

84 4,025,749
119 4,025,750
216 4,025,751
384 4,025,752
388 4,025,753
400 4,025,754
549 4,025,755

**CLASS 220**

5 A 4,024,978
71 4,024,979
260 4,024,980
269 4,024,981
293 4,024,982
316 4,024,983

**CLASS 221**

203 4,024,984

**CLASS 222**

1 4,024,985
5 4,024,986
146 HA 4,024,987
153 4,024,988
154 4,024,989
180 4,024,990
189 4,024,991
211 4,024,992
272 4,024,993
326 4,024,994
402.11 4,024,995
437 4,024,996

**CLASS 224**

2 R 4,024,997
5 R 4,024,999

**CLASS 225**

100 4,025,023

**CLASS 226**

3 4,025,024
7 4,025,026
33 4,025,025
181 4,025,027

**CLASS 227**

7 4,025,028
10 4,025,029
112 4,025,030
132 4,025,031
141 4,025,032

**CLASS 228**

33 4,025,033
41 4,025,034
185 4,025,035
193 4,025,036
214 4,025,037

**CLASS 229**

2.5 EC 4,025,038
27 4,025,039

**CLASS 234**

1 4,025,040

**CLASS 235**

1 E 4,025,756
54 F 4,025,757
61.11 E 4,025,761
61.7 B 4,025,759
4,025,760
61.7 R 4,025,758
150.1 4,025,762
4,025,763
151.11 4,025,764
151.21 4,025,765
152 4,025,766
153 AC 4,025,767
4,025,768
156 4,025,769
4,025,771
4,025,772
164 4,025,773
168 4,025,774
181 4,025,775

**CLASS 236**

90 4,025,041
101 C 4,025,042

**CLASS 237**

53 4,025,043

**CLASS 238**

349 4,025,044

**CLASS 239**

288.5 4,025,045
333 4,025,046
459 4,025,000

**CLASS 240**

1 LP 4,025,776
1.4 4,025,777
4,025,778
8.16 4,025,896
10 L 4,025,779
51.11 R 4,025,780
64 4,025,782

**CLASS 241**

24 4,025,001

**CLASS 242**

18 G 4,025,002
43 R 4,025,003
55.3 4,025,004
66 4,025,009
75.2 4,025,005
86.5 R 4,025,006

**CLASS 244**

3.26 4,024,998
15 4,025,007
53 B 4,025,008

**CLASS 248**

4 4,025,010
54 R 4,025,011
163 4,025,012
4,025,013
203 4,025,014
205 A 4,025,015
210 4,025,016
297 4,025,017
303 4,025,018
317 4,025,019
385 4,025,020

**CLASS 249**

61 4,025,021
63 4,025,022
204 4,025,047

**CLASS 250**

199 4,025,783
201 4,025,784
204 4,025,785
205 4,025,440
211 R 4,025,786
223 R 4,025,770
251 4,025,787
253 4,025,788
284 4,025,790
315 R 4,025,789
341 4,025,791
343 4,025,792
370 4,025,793
381 4,025,794
504 4,025,795
540 4,025,441
560 4,025,796
568 4,025,442

**CLASS 251**

38 4,024,884
144 4,025,048
149.6 4,025,049
306 4,025,050
335 A 4,025,051

**CLASS 252**

8.5 A 4,025,443
8.8 4,025,444
47.5 4,025,451
49.6 4,025,445
51.5 A 4,025,452
51.5 R 4,025,446
56 S 4,025,447
60 4,025,448
62.63 4,025,449
89 R 4,025,450
102 4,025,453
182 4,025,454
316 4,025,455
351 4,025,456
373 4,025,457
416 4,025,458
429 R 4,025,459
457 4,025,460
462 4,025,461
477 R 4,025,462
500 4,025,463
4,025,464

**CLASS 254**

76 4,025,052
122 4,025,053
126 4,025,054
172 4,025,055

**CLASS 259**

6 4,025,056
154 4,025,057
192 4,025,058

**CLASS 260**

2.1 E 4,025,467
2.5 AC 4,025,466
2.5 AJ 4,025,468
4,025,470
2.5 AW 4,025,469
2.5 R 4,025,465
16 4,025,471
17.4 GC 4,025,472
19 R 4,025,473
22 CB 4,025,475
22 CQ 4,025,474
4,025,476
23 EP 4,025,477
27 BB 4,025,479
27 R 4,025,478
28.5 A 4,025,480
29.6 F 4,025,481
29.6 MM 4,025,483
29.6 T 4,025,482
33.6 UA 4,025,484
37 SB 4,025,485
45.75 N 4,025,488
45.8 NT 4,025,486
45.9 NC 4,025,487
47 XA 4,025,489
53 R 4,025,490
75 4,025,491
75 R 4,025,492
4,025,493
78 A 4,025,494
79.1 4,025,495
4,025,496
79.5 B 4,025,497
95 A 4,025,498
112 B 4,025,500
112.5 R 4,025,499
121 4,025,501
192 4,025,502
239 E 4,025,503
239.1 4,025,504
4,025,506
239.3 B 4,025,505
240 B 4,025,507
243 C 4,025,509
243 D 4,025,508
243 R 4,025,510
244 A 4,025,511
244 R 4,025,512
251 A 4,025,513
256.4 C 4,025,517
256.4 N 4,025,514
4,025,515
279 QA 4,025,518
283 SA 4,025,519
285 4,025,520
4,025,521
287 B 4,025,522
296 R 4,025,524
297 R 4,025,523
299 4,025,525
302 H 4,025,527
302 R 4,025,526
306.8 R 4,025,528
309.6 4,025,529
310 R 4,025,530
327 M 4,025,532
332.5 4,025,531
340.7 4,025,533
343.6 4,025,534
345.2 4,025,535
345.3 4,025,516
4,025,536
347.5 4,025,537
397.6 4,025,538
404 4,025,539
410.7 4,025,540
439 CY 4,025,541
456 A 4,025,544
456 R 4,025,542
465 H 4,025,543
465.7 4,025,545
473 A 4,025,546
476 R 4,025,547
486 B 4,025,548
486 R 4,025,549
518 A 4,025,550
518 R 4,025,551
520 E 4,025,552
521 R 4,025,553
562 A 4,025,554
564 R 4,025,555
567.5 4,025,556
570 D 4,025,557
570.5 CA 4,025,558
578 4,025,559
583 K 4,025,561
586 E 4,025,563
586 P 4,025,562
586 R 4,025,564
604 R 4,025,565
613 D 4,025,566
616 4,025,567
648 R 4,025,568
649 R 4,025,569
651 R 4,025,570
668 D 4,025,571
4,025,572
674 A 4,025,573
677 A 4,025,574
682 4,025,575
4,025,576
683.51 4,025,577
837 R 4,025,578
858 4,025,579
874 4,025,580
880 R 4,025,581
885 Re.29,231
897 R 4,025,582
925 4,025,583
946 4,025,584
956 4,025,585
986 4,025,586

**CLASS 261**

30 4,025,587
34 A 4,025,588
69 A 4,025,589
122 4,025,590

**CLASS 264**

3 R 4,025,591
78 4,025,592
94 4,025,593
97 4,025,594
103 4,025,595
117 4,025,596
138 4,025,597
140 4,025,598
167 4,025,599
262 4,025,600
291 4,025,601

**CLASS 266**

215 4,025,059
240 4,025,060
249 4,025,061
251 4,025,062

**CLASS 267**

153 4,025,063

**CLASS 269**

87.3 4,025,064

**CLASS 270**

12 4,025,065

**CLASS 271**

9 4,025,066
33 4,025,067
34 4,025,068
147 4,025,069

**CLASS 272**

99 4,025,070

**CLASS 273**

29 A 4,025,071
73 F 4,025,072
85 D 4,025,073
101 4,025,074
135 AB 4,025,075
137 R 4,025,076
166 4,025,077
186 A 4,025,078

**CLASS 277**

220 4,025,079

**CLASS 280**

5 A 4,025,080
7.14 4,025,081
12 H 4,025,082
87.05 4,025,083
141 4,025,084
446 B 4,025,085
481 4,025,086
631 4,025,087
644 4,025,088
738 Re.29,228

**CLASS 282**

27.5 4,025,089
4,025,090

**CLASS 285**

53 4,025,091
94 4,025,092
343 4,025,093

**CLASS 292**

87 4,025,094
108 4,025,095
158 4,025,096
207 4,025,097

**CLASS 293**

30 4,025,098
58 4,025,099

**CLASS 294**

74 4,025,100

**CLASS 296**

1 R 4,025,101
23 MC 4,025,102
95 C 4,025,103
155 4,025,104

**CLASS 297**

4 4,025,105
16 4,025,106
17 4,025,107
335 4,025,108
355 4,025,109
385 4,025,110
390 4,025,111
411 4,025,112
434 4,025,113
452 4,025,114

**CLASS 299**

2 4,025,115
17 4,025,116
18 4,025,119
34 4,025,117
43 4,025,118
4,025,120

**CLASS 302**

14 4,025,121
49 4,025,122

**CLASS 303**

6 R 4,025,123
10 4,025,124
33 4,025,125
4,025,126
118 4,025,127

**CLASS 307**

116 4,025,797
118 4,025,798
141 4,025,804
207 4,025,799
225 C 4,025,800
237 4,025,803
350 4,025,802
362 4,025,801

**CLASS 308**

3 R 4,025,129
6 C 4,025,128
9 4,025,130
27 4,025,131
36.1 4,025,132
73 4,025,133
122 4,025,134
194 4,025,135
207 A 4,025,136

**CLASS 310**

8.7 4,025,805
9.4 4,025,806
46 4,025,807
68 B 4,025,808
81 4,025,809
162 4,025,810
168 4,025,960

**CLASS 312**

114 4,025,137
334 4,025,138

**CLASS 313**

22 4,025,811
102 Re.29,233
105 CM 4,025,813
176 4,025,812
367 4,025,814
371 4,025,815

**CLASS 315**

169 R 4,025,816
241 P 4,025,817
337 4,025,818

**CLASS 318**

6 4,025,830
221 H 4,025,833
228 4,025,834
254 4,025,831
4,025,835
317 4,025,832
490 4,025,836
561 4,025,837
568 4,025,838
632 4,025,839
673 4,025,858
696 4,025,859

**CLASS 320**

3 4,025,860
23 4,025,861

**CLASS 321**

2 4,025,862
18 4,025,863
68 4,025,864

**CLASS 322**

52 4,025,840

**CLASS 323**

9 4,025,841
19 4,025,842
22 T 4,025,843

**CLASS 324**

43 R 4,025,844
51 4,025,845
61 P 4,025,846
65 R 4,025,847
83 D 4,025,848
127 4,025,849
133 4,025,850
163 4,025,934

**CLASS 325**

31 4,025,851
38 B 4,025,852
55 4,025,853
67 4,025,854
137 4,025,855
379 4,025,856
452 4,025,857

**CLASS 328**

14 4,025,865
38 4,025,866
127 4,025,867
141 4,025,868
162 4,025,869

**CLASS 330**

20 4,025,870
22 4,025,871
34 4,025,872
35 4,025,873

**CLASS 331**

55 4,025,874
94.5 S 4,025,875
107 A 4,025,876
113 R 4,025,877

**CLASS 333**

10 4,025,878
71 4,025,879
72 4,025,880
98 R 4,025,881

**CLASS 334**

45 4,025,882

**CLASS 335**

16 4,025,883
129 4,025,884
154 4,025,885
195 4,025,886
278 4,025,887

**CLASS 337**

266 4,025,888
408 4,025,889

**CLASS 338**

2 4,025,890
28 4,025,891
35 4,025,892
212 4,025,893

**CLASS 339**

14 R 4,025,139
37 4,025,140
99 R 4,025,141
128 4,025,142
133 R 4,025,144
143 R 4,025,145
147 P 4,025,146
176 MP 4,025,147
4,025,148
177 R 4,025,149
4,025,150
210 M 4,025,151
246 4,025,152
255 R 4,025,153
278 C 4,025,143

**CLASS 340**

3 R 4,025,894
4,025,895
52 C 4,025,781
52 R 4,025,897
146.3 E 4,025,898
147 R 4,025,899
172.5 4,025,900
4,025,901
4,025,902
4,025,903
4,025,904
4,025,905
4,025,906
173 CA 4,025,907
4,025,908
173 FF 4,025,909
173 LS 4,025,910
174 TF 4,025,911
189 M 4,025,912
4,025,913
204 4,025,914
237 S 4,025,915
249 4,025,916
347 DD Re.29,234
4,025,917
409 4,025,918

**CLASS 343**

5 DP 4,025,920
5 R 4,025,921
5 VQ 4,025,919
6.5 LC 4,025,922
106 R 4,025,923
121 4,025,924

**CLASS 346**

1 4,025,926
74.1 4,025,927
75 4,025,925
140 A 4,025,928

**CLASS 350**

7 4,025,154
45 4,025,155
96 C 4,025,157
96 WG 4,025,156
99 4,025,158
105 4,025,159
117 4,025,160
160 LC 4,025,161
4,025,162
4,025,164
160 R 4,025,163
161 S 4,025,165
161 W 4,025,166
184 4,025,167
196 4,025,168
212 4,025,169
214 4,025,170
255 4,025,171
285 4,025,203
294 4,025,172
304 4,025,173

**CLASS 351**

160 Re.29,229

**CLASS 352**

72 4,025,174

**CLASS 353**

23 4,025,175
26 A 4,025,176
27 A 4,025,177

**CLASS 354**

50 4,025,929
64 4,025,930
105 4,025,931
109 4,025,932
141 4,025,933
173 4,025,935
286 4,025,936
318 4,025,937
324 4,025,938

**CLASS 355**

3 DD 4,025,179
3 R 4,025,178
4,025,180
4,025,181
4 4,025,182
5 4,025,183
10 4,025,184
4,025,185
14 4,025,186
4,025,187
16 4,025,188
38 4,025,189
68 4,025,190
71 4,025,191

**CLASS 356**

5 4,025,193
4,025,194
71 4,025,195
101 4,025,196
111 4,025,197
152 4,025,192
163 4,025,198
190 4,025,199
201 4,025,200
240 4,025,201
4,025,202

**CLASS 357**

18 4,025,939
23 4,025,940
26 4,025,942
27 4,025,941
30 4,025,943
67 4,025,944

**CLASS 358**

1 4,025,945
81 4,025,946
86 4,025,947
122 4,025,948
128 4,025,949
133 4,025,950
158 4,025,951
4,025,952
191 4,025,953
213 4,025,954
219 4,025,955
280 4,025,718

**CLASS 360**

2 4,025,956
48 4,025,957
73 4,025,958
85 4,025,959

**CLASS 361**

8 4,025,820
45 4,025,822
111 4,025,821
4,025,823
236 4,025,819
305 4,025,829
332 4,025,824
334 4,025,826
374 4,025,825
433 4,025,827
436 4,025,828

**CLASS 401**

109 4,025,204
121 4,025,205
123 4,025,206

**CLASS 403**

46 4,025,207
157 4,025,208
189 4,025,209
240 4,025,210
361 4,025,211
4,025,212
370 4,025,213
4,025,214
381 4,025,215
4,025,216

**CLASS 404**

100 4,025,217

**CLASS 408**

11 4,025,218
29 4,025,219

**CLASS 415**

7 4,025,220
43 4,025,222
54 4,025,223
60 4,025,224
90 4,025,225
115 4,025,226
160 4,025,227
205 4,025,228
216 4,025,229

**CLASS 416**

18 4,025,230
144 4,025,231
191 4,025,232
207 4,025,233

**CLASS 417**

28 4,025,234
54 4,025,235
128 4,025,236
131 4,025,237
203 4,025,238
292 4,025,239
365 4,025,240
477 4,025,241

**CLASS 418**

13 4,025,242
61 B 4,025,243
61 R Re.29,230
87 4,025,244
94 4,025,245
120 4,025,247
151 4,025,246
184 4,025,248

**CLASS 423**

7 4,025,602
239 4,025,603
4,025,604
240 4,025,605
245 4,025,606
305 4,025,608
415 P 4,025,609
461 4,025,610
580 4,025,560
632 4,025,611
655 4,025,612

**CLASS 424**

21 4,025,613
45 4,025,614
46 4,025,615
52 4,025,616
78 4,025,617
101 4,025,618
115 4,025,619
4,025,620
127 4,025,621
180 4,025,622
4,025,623
233 4,025,624
246 4,025,625
4,025,626
248.4 4,025,627
249 4,025,628
250 4,025,629
256 4,025,630
258 4,025,631
263 4,025,632
267 4,025,633
4,025,634
269 4,025,635
4,025,636
272 4,025,637
273 4,025,607
4,025,638
4,025,639
275 4,025,640
282 4,025,641
283 4,025,642
300 4,025,643
4,025,644
304 4,025,646
4,025,647
309 4,025,648
312 4,025,645
318 4,025,649
319 4,025,650
320 4,025,651
322 4,025,652
325 4,025,653
330 4,025,654

**CLASS 425**

6 4,025,249
17 4,025,250
31 4,025,251
67 4,025,252
72 R 4,025,253
81 4,025,254
114 4,025,255
4,025,256
115 4,025,257
123 4,025,258
4,025,259
131.1 4,025,260
139 4,025,261
145 4,025,262
168 4,025,263
190 4,025,264
211 4,025,265
236 4,025,267
242 R 4,025,266
246 4,025,268
249 4,025,269
297 4,025,270
318 4,025,271
324 R 4,025,272
332 4,025,273
376 B 4,025,274
383 4,025,277
387 B 4,025,276
387 R 4,025,275
404 4,025,278
463 4,025,279

**CLASS 426**

61 4,025,696
66 4,025,655
92 4,025,656
579 4,025,657
598 4,025,658
613 4,025,659

**CLASS 427**

28 4,025,660
68 4,025,661
157 4,025,662
161 4,025,663
183 4,025,664
192 4,025,665
197 4,025,666
215 4,025,667
226 4,025,669
227 4,025,668
231 4,025,670
286 4,025,671
388 C 4,025,672

**CLASS 428**

29 4,025,673
4,025,674
36 4,025,675
40 4,025,676
63 4,025,677
90 4,025,678
91 4,025,679
113 4,025,680
116 4,025,681
215 4,025,683
257 4,025,684
304 4,025,685
310 4,025,686
4,025,687
350 4,025,688
402 4,025,689
407 4,025,690
411 4,025,691
418 4,025,692
447 4,025,693
480 4,025,682
4,025,694
492 4,025,695
584 4,025,313
680 4,025,314

**CLASS 429**

4 4,025,698
70 4,025,697
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|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 : | 244,467 | | 244,483 | | 244,484 | | 244,461 | | 244,472 | 44 : | 244,463 |
| 4 : | 244,457 | | 244,485 | | 244,488 | 31 : | 244,407 | | 244,481 | 48 : | 244,426 |
| 6 : | 244,408 | 8 : | 244,459 | 19 : | 244,430 | | 244,449 | 37 : | 244,417 | | 244,437 |
| | 244,411 | 9 : | 244,447 | | 244,477 | 35 : | 244,436 | 39 : | 244,427 | | 244,458 |
| | 244,424 | 12 : | 244,464 | 20 : | 244,444 | 36 : | 244,414 | | 244,438 | 49 : | 244,487 |
| | 244,432 | | 244,490 | 22 : | 244,418 | | 244,423 | | 244,450 | 51 : | 244,460 |
| | 244,439 | 17 : | 244,420 | 24 : | 244,451 | | 244,425 | 40 : | 244,413 | 53 : | 244,442 |
| | 244,446 | | 244,422 | | 244,466 | | 244,428 | | 244,434 | 55 : | 244,421 |
| | 244,462 | | 244,433 | 29 : | 244,409 | | 244,429 | | 244,486 | | 244,445 |
| | 244,471 | | 244,479 | | 244,412 | | 244,470 | | 244,489 | | 244,448 |
| | 244,473 | | 244,480 | | | | | | | | |

U. S. GOVERNMENT PRINTING OFFICE : O - 1977

U.S. DEPARTMENT OF COMMERCE
Juanita M. Kreps, Secretary

PATENT AND TRADEMARK OFFICE
C. Marshall Dann, Commissioner